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MAY 1953

CCJ COMMERCIAL CAR JOURNAL

THE MAGAZINE FOR TRUCK AND BUS FLEET OPERATORS

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Old Noah knew a thing or two,
His basic idea was fine;
It pointed the way to what's known today
As Reo's More-Pay-Load Design.

NOAH says: "It's raining profits for every owner of low-cost Reo transportation. Reo more-pay-load design hauls greater weight within legal limits. Reo Gold Comets deliver highest h.p., per pound, of any 7-main-bearing truck engine. Reos make sense, make friends, make money—come drought or high water."

REO MOTORS, INC.
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NOW! A COMPLETELY NEW 160-H.P. REO SUPER GOLD COMET . . . THE MOST EFFICIENT 50,000-LB. G. C. W. TRUCK ENGINE EVER BUILT . . . *Ask about it*

"I switched to Dodge because of its new power"

. . . says **JOHN R. BRAUE**, *General Manager, R. F. S. Co., (Transportation Engineers), Chicago, Ill.*

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Even with their rugged 100 to 171 horsepower, Dodge engines are *not* spendthrifts. Higher compression ratios (up to 7.1 to 1) squeeze extra mileage from every gallon. Other economy features include light, 4-ring aluminum-alloy pistons, chrome-plated top rings, and exhaust valve seat inserts. Just hitch your loads to new Dodge *"Job-Rated"* trucks. Watch ton-miles per hour climb . . . cash outgo per hour drop.

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Advanced dual-primary-type brakes in 1- through 4-ton models assure smooth, sure stops with less pedal pressure . . . work equally well whether going forward or backing. New reinforced cab construction gives greater strength. No-shift Truck-o-matic transmission in ½-, ¾-ton trucks, Dodge-Tint glass and higher output heaters available. See your friendly Dodge dealer. He'll gladly show you why Dodge trucks are star performers on any hauling team.

DODGE

"Job-Rated" TRUCKS

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Quality Products Deserve Quality Representation

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Dented bodies do not reflect Care and Quality in your Business. Rusted and corroded truck bodies are not Good Advertisements!

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JOURNAL

CCJ READER DIGEST

Skill Plus or Minus Attitude Equals Performance

U. S. Army traffic safety expert Don Buck readng the book, "Forty-eight Million Tons to Ike," came across logical proof that accidents can be prevented . . . Here he applies the proof to traffic accidents, shows how to build better driver attitude and prevent accidents. Page 64.

Condition Maintenance Extends Parts Life

Parts replacement on a mileage basis in some cases meant wasted parts life, in other cases road failures, so Capital Transit Co., Washington, D. C., scrapped the idea, worked out a "Condition Maintenance Theory" . . . Here is how controlled inspections extended bus parts life. Page 66.

Don't Spare the Rods or You'll Ruin the Engine

Appearances can be deceiving when it comes to connecting rods, says Federal-Mogul's Walter Thill . . . Often neglected because they look O.K., he explains what defects to look for—and how they happen . . . Check your con rods carefully; save an engine. Page 70.

Light Delivery Bodies—Aluminum or Steel?

Light-weight, multi-stop delivery fleet operators bump into this question every time they buy a body . . . What's the answer? Well, that depends on the specific operation . . . But, here is the case for aluminum and the case for steel aimed to help you eliminate guesswork, make an intelligent decision. Page 76.

Analyze and then Correct Bearing Failures

It is good maintenance to replace engine bearings when they are worn out . . . It is better preventive maintenance to know why they fail and then correct the cause . . . H. W. Luetkemeyer, Cleveland Graphite Bronze Co., shows how to analyze bearings, recognize why they failed. Page 80.

Propane Cabs Save 12% in Fuel — 50% in Oil

At about $150 per cab, Boynton Cab Co., Milwaukee, Wis., converted 199 vehicles to LP gas, operate them at .0257¢ per mile as compared to .0292¢ per mile for 10 cabs still using gasoline, a 12 per cent saving in operating costs. Page 86.

Here's Hygrade's pump with the "never-say-die" diaphragm

Nobody has to tell *you* that it's the diaphragm that makes or breaks a fuel pump. You've seen too many perfectly good pumps fold up after only a few thousand miles because the diaphragm "went".

Here's HYGRADE'S solution — the one-piece, non-corrosive *Monoflex* diaphragm that *lasts for the life of the pump.* And it's not just the rugged material in it that makes *Monoflex* the longest-lived diaphragm on the market—it's also the way it's fitted. The diaphragm is so tightly sandwiched between the smooth casting surfaces that not even the *smell* of gas can escape.

Its great diaphragm isn't the only reason for this HYGRADE fuel pump's popularity with fleet men. For instance, the rocker arm is heat-treated for extra strength and minimized wear. And its valve springs are phosphor bronze, oil-treated, remain perfectly elastic.

Write our engineering department for complete details. That's HYGRADE PRODUCTS DIVISION, Standard Motor Products, Inc., 37-18 Northern Boulevard, Long Island City 1, New York

HYGRADE

Carburetor Kits • Fuel Pumps & Kits • Speedometer Cables & Casings

BATTERIES LAST WHEN YOU SPOT TROUBLES FIRST

Trouble-spotting unit saves batteries, time and money!

GOODYEAR's easy-to-follow Fleet Battery Maintenance Plan will help to prolong the life of every battery you own.

Here's how:

Every time your maintenance man waters batteries, he makes a quick check with the Goodyear All-Purpose Battery Tester and marks his findings on this safety-check Fleet Battery Maintenance Card. Should any one of your man's markings be placed outside the green colored safety zone which is indicated on the card, you know there is trouble.

Your trouble may stem from the fact that your voltage regulator is set too high. This could burn out the battery—shorten the life of every replacement element in the electrical system. On the other hand you could have a low voltage regulation setting—with frequent battery discharges, recharges and premature failures.

Such conditions are located quickly!

When you use this plan in conjunction with Goodyear heavy-duty truck and bus batteries, you save even more. Put this moneysaving plan to the test on your fleet right away. Mail the coupon for full information. Goodyear, Battery Department, Akron 16, Ohio.

GOODYEAR

THE GREATEST NAME IN RUBBER

CLIP THIS COUPON AND START SAVING!

THE GOODYEAR TIRE & RUBBER COMPANY, INC.
Dept. 729 C, Akron 16, Ohio.

Please show me how to save on battery and electrical part costs — with full details on Goodyear's Fleet Battery Maintenance Plan.

Name.....

Firm Name.....

Street Address.....

City.....Zone.....State.....

Number of Trucks in Fleet.....

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

The OVERLOAD

EDITORIAL COMMENT

Needless Transportation Dollars to Washington

RECENTLY in Washington a high ranking official of the Department of Commerce made an intriguing statement. Since taking office late last year he had discovered that there were 43 Federal Government agencies working on transportation problems. He added, somewhat facetiously, that just possibly the government could get along with only 42, thereby saving tax dollars.

As CCJ readers well know, we seldom get into political discussions. We believe that the specialized business magazine is primarily a working tool of the industry it serves, rather than a clairvoyant on political issues. On that basis we survived the Fall of '52 without comment. It was tough, but we did it.

The 43 agencies, however, are horses of different colors. Who are they? What do they do? How much duplication is involved? Obviously they directly affect the number of tax dollars being sent to Washington by the transportation industry.

Initial search has been discouraging, but also an eye opener. The government official, who for obvious reasons shall remain anonymous, backed down but quick. No such list was available from his office. Obviously, he regards it as political dynamite.

But our Washington staff did far better; produced a positive list of 35 agencies, exclusive of the military. To list them in detail would occupy this entire page; contribute little to improvement.

Instead we would like to raise the general question—How much longer must we continue to send needless dollars to Washington, to be returned in services at double or triple the cost that the same job could be done by private industry?

We would be the last to suggest doing without such vital services as the ICC (for which virtually everyone agrees still *more* dollars are needed), the Civil Aeronautics Administration, the Bureau of Public Roads and many others. And we hesitate without full facts and figures to jump on any particular agency when it can undoubtedly be proved that in some measure its products are worthwhile.

But as an example, why should the Bureau of Agricultural Economics (Dept. of Agriculture) be called upon to produce a 50-page booklet entitled "regulations on Weight of Motor Trucks"? The booklet becomes the more intriguing from a Federal taxpayer's viewpoint when we read the subhead: "Problems Illustrated by Wisconsin's Experience in Hauling Fluid Dairy Products." And still more intriguing when it is realized that 12 of the 48 pages are devoted to a "recap" on the Maryland Road Test and many more are direct quotes from government or quasi-government agencies such as the Highway Research Board. Perhaps the booklet is of value to someone. But who? How many? And how much? It would be easy to fill a 48-page book with similar examples. Here is just one more.

Recently Defense Transport Administration made an excellent study of Class I motor carriers. It was of sufficient importance that we carried a condensation of the report in a recent issue. But most of the data was already in the files of American Trucking Associations. It could have been whipped into shape at a fraction of the cost of the government study. Would it not be far better for those who *want* the data to pay for it directly? Certainly if the cost were split among 5000 or so who want the study, it would cost them more dollars than they paid as part of 50,000,000 taxpayers. But at the same time they would save the cost of similar studies wanted by plumbers, electricians, candlestick makers or what any of perhaps 5000 other industries. In the long run the bill would be far less.

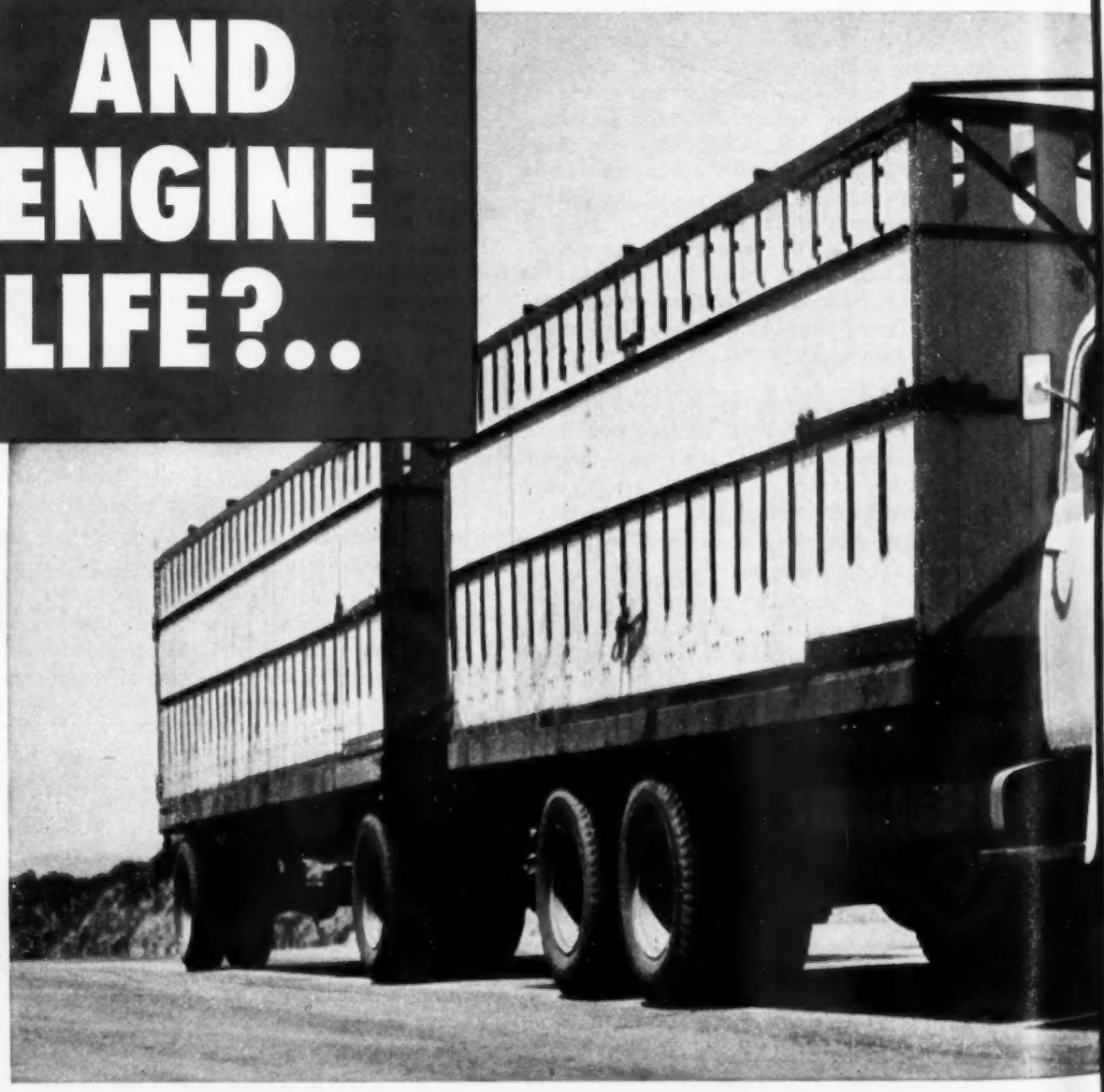
History has proved that jobs done in Washington nearly always cost more dollars than similar jobs in private industry. There are encouraging signs that the trend is at last turning. Let's all keep the heat on to make sure it continues.

Bart Rawson
Editor

WANT LONGER CHASSIS AND ENGINE LIFE?..

USE TEXACO MARFAK in your chassis bearings and get full protection against wear and rust – protection that lasts for extra hundreds of miles. *Texaco Marfak* is both adhesive and cohesive. It *stays in* the bearings in spite of heavy loads, rough roads or puddle splash. You'll find it adds greatly to the life of chassis parts, cuts your maintenance costs.

In wheel bearings, similar results come when you use *Texaco Marfak Heavy Duty*. This is the



TUNE IN:
Tuesday nights
on television –
the TEXACO STAR THEATER
starring MILTON BERLE.

See newspaper for
time and station.

TEXACO

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At Your Service

TIMELY NOTES ON MAINTENANCE AND OPERATION

by **MURRAY SIMKINS** Managing Editor

When Fuel Consumption is High . . .

CARBURETOR manufacturers rarely recommend changing of the jets to improve fuel economy. Except in certain cases where jets are actually of improper size, there are other more common causes of poor economy. Excessive fuel pump pressure is a frequent cause of poor performance. A high fuel level may cause an overrich mixture. The accelerating pump may be permitting pull-over at high speeds. Dirt under the pump needle will hold the needle off its seat so that vacuum will draw fuel into the main discharge jet. Plugged idle or high speed jets, or a sticking inlet needle will cause a high level and engine flooding at idle. And, of course, the choke butterfly valve, if worn or set improperly, will cause an enrichment of fuel mixture.

These are only a few of the possible carburetor troubles causing poor fuel economy. A careful test under idle and various load conditions with reliable instruments will guide the mechanic in his trouble-shooting. However, a check up of the driver may be a short cut to poor performance complaints.

Oil Trap Saves Engine Wear

IT has come to our attention that several bus and truck fleets are experimenting with a piece of felt fitted to the clean-out plate of the crankcase to catch metal particles from the oil. Periodically the felt is removed and cleaned with solvent, thus catching much of the deleterious filings and grit before they recirculate to engine bearings.

Valve Seat Problems

WITH valve seat distortion the seat will show burnished areas on some portions of the seating surface. Other areas will be dull due to the accumulation of deposits. Seat distortion has a pronounced effect on valve temperatures, causing aggravated thermal stressing in the valve, cracking of the face and severe guttering behind the base material. High stresses are set up in the underhead section and these, if allowed to continue for prolonged periods, lead to broken valves.

Where conditions of seat distortion are present, certain measures can be taken such as using faced valves, faced and coated valves, sodium-cooled valves or soft valve seat inserts. Sodium-cooled valves will reduce valve head temperatures from 200 to 300 deg F. A soft insert material made of highly corrosion resistant material allows for the pounding in of the valve to give a good seating surface under all conditions. The use of a flexible design of insert allows for distortion of the cylinder head in that area where the greatest heat is localized without exerting stress on the insert. The insert can thus be held in by a shrink fit in a relatively cool section of the exhaust port. This type modification, however, is costly at present.

As far as the fleet operator is concerned, the use of rotators seems to be about the most practical method of controlling valve seat distortion. This unit, by imparting positive rotation to the valve, prevents hot spots at any one point of the valve so that valve life is prolonged from two to five times.

These comments were taken from a paper presented by John Newton and M. J. Tauschek at the SAE Passenger Car, Body and Materials Meeting in Detroit.

Watch the Spark Plug Electrodes

IT requires up to 50 per cent more voltage to fire a spark plug with a rounded center electrode than it does when the electrode is filed to a square end. So you can save wear and tear on the system by giving periodic attention to the plug gap. Replace with new plugs when the electrodes begin to show wear. You will soon pay for them in improved performance and better fuel economy.

Resistors Save Spark Plugs

RESISTORS or suppressors reduce high frequency oscillation in the secondary circuit voltage, and they also reduce spark plug electrode erosion, according to a bulletin issued by Sun Electric Corp. Secondary suppression reduces the total current flow across the plug gap, but this does not mean that ignition efficiency is impaired.

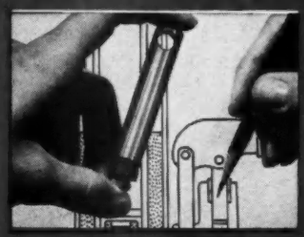
On first thought, one might assume that suppressors in the secondary ignition circuit might reduce the voltage available to fire the spark plug. Actually, the same voltage will be available since no voltage is lost

(TURN TO PAGE 12, PLEASE)

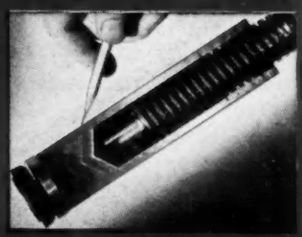
FOR ANY PAY LOAD... ...IT PAYS TO CARRY A

FEATURES LIKE THESE ARE YOUR GUARANTEE OF DEPENDABILITY

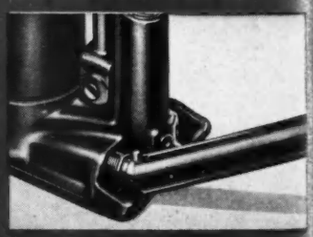
"Self-Locking" Extension Screw with Integral Cap



"Snug-Fit" Power Pump



"Solid-End" Lifting Ram



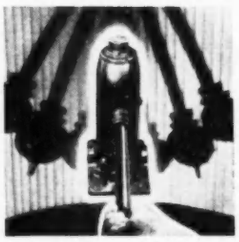
"Micro-Accurate" Safety Release

WALKER "Series 900" Portable Hydraulic JACK

Experienced truck operators know a safe, dependable tool box jack is a "must" to keep pay-loads rolling. That's why you'll find Walker *Series 900* Portable Hydraulics in trucks that go coast to coast or just around the block.

From cap to base, Walker *Series 900's* are the product of years of on-the-job experience; careful, constantly refining engineering; and manufacturing "know-how."

Take the new "Projectile" tank. It's designed in the shape of a heavy armor-piercing shell to withstand shock . . . to better resist eccentric loading . . . and to distribute the load more evenly on the base.



"Pendulum Balance" makes positioning easy. When you lift it by the handle, a *Series 900* automatically takes an upright position. You can't break or lose the cap. It's forged of high carbon steel as an integral part of the coarse-threaded, quickly-adjusted extension screw.

Smooth, dependable operation is assured by "Ryth-Matic" valve action. Suction and discharge valves work in perfect synchronization at lightning speed. And the "Snug-Fit" Power Pump, sealed with specially impregnated cup leathers, saves time and effort. At top height there's extra strength to resist eccentric loads in the "Solid End" Lifting Ram. Lowering is always safely and easily controlled by the "Micro-Accurate" Release.

Yes, for any pay-load, it pays to carry a Walker *Series 900* portable hydraulic in the tool box. See them—try them—at your Walker Jack distributor.

WALKER MANUFACTURING CO. OF WISCONSIN • RACINE, WISCONSIN

Jacks • Exhaust Silencers • Oil Filters

There's a Walker "Series 900" Portable Hydraulic Jack for Every Vehicle in Your Fleet.

8 MODELS

CAPACITIES FROM 1½ TO 50 TONS

What's *News* at Walker

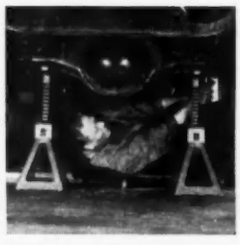
Holds the Heavyweight Title

When this Walker 10-Ton Hydraulic Roll-A-Car rolls into action, even the heaviest trucks and buses give ground in a hurry. With its special precision-honed power cylinder, only a minimum of effort is required to safely lift the heaviest loads. Roller bearing wheels and ball bearing casters make for easy maneuvering, quick positioning, and dollying. 3-position handle locks at most convenient operating level and the long, low rugged frame is ideally suited for low clearance. No. 780 goes under and up with ease.

The Modern Spirit of "76"

There's spirited enthusiasm for the revolutionary new Walker "76"—the only completely portable self-contained hydraulic one-end lift on the market . . . unmatched for versatility, dependability, performance. Two tons of hydraulic lifting power make it one of the handiest, most essential shop aids ever devised. A 44″ top height makes it ideal for body and fender work—speeds exhaust replacements, undercoating, shock service and many other "hard-to-get-at" jobs—meets many extra lift requirements. See your Walker Distributor for a "76" demonstration.

Frees "Front-Line" Equipment for Action



Vehicles elevated for long periods need not tie up valuable jacks and lifts—free them for action with Walker "Rigid Racks." Constructed of break-proof malleable iron on the patented "Wedge-Lock" principle, they provide safe dependable service for a lifetime. Walker "Rigid-Racks" won't topple or slip, regardless of height . . . there are no springs or pins to shear. 2 to 5 ton capacity.

Send Walker Jacks Back Home for Repairs

For fast, factory-supervised repairs, with "new jack" guarantee, ask your Walker Distributor for address of the nearest Authorized Walker Jack Service Station.

Walker Leads in Jacks

In transportation . . . in industry . . . in every field of activity where heavy loads must be lifted safely and economically, Walker Jacks are the standard of dependability.

GET IT FROM YOUR JOBBER

Your Walker distributor is JACK HEADQUARTERS

FOR MORE RUNS
FEWER LAYUPS

Specify
Leece-Neville
Alternators

Over 7 years of fleet performance has proved the unmatched reliability of L-N Alternators. Many of them have run 500,000 miles and more with only routine maintenance. With 25 to 40 amps at idle and high output at all speeds, L-N Alternators carry the entire electrical load, leaving batteries for starting only. Think what this freedom from electrical breakdown can mean for *your* fleet! There are 6-volt L-N Alternator Systems of 50 and 95 amps capacities; 50 to 150 amps for 12 volts. Be sure to specify L-N.

Out front over 43 years

Since 1909 Leece-Neville has been in the forefront of invention, development and perfection of automotive electric equipment. The *first* generators and cranking motors used as standard equipment on automobiles were built by Leece-Neville, who also brought out the *first* third-brush generator. Today, with outstanding engineering and production facilities, L-N is the acknowledged leader in design and manufacture of special and heavy-duty electric units. The Leece-Neville Company, Cleveland 14, Ohio.

YOU CAN RELY ON Leece-Neville

ALTERNATOR SYSTEMS • GENERATORS
CRANKING MOTORS • REGULATORS
SWITCHES • SMALL MOTORS

TRUCK BUS DIESEL OFF-HIGHWAY
PASSENGER RAILROAD MARINE INDUSTRIAL

CCJ At Your Service

Continued from Page 9

across the resistors until current starts flowing and current does not flow until the plug fires. But when the plug does fire and current starts flowing in the secondary circuit, voltage drop increases across the resistors and this reduces the voltage and current flow across the plug gap so that the spark is reduced in intensity and duration.

Ignition engineers have observed that the lowest energy, shortest duration spark that can be produced across a plug gap is all that is needed to fire a cylinder. An increase in intensity and duration of spark does not improve combustion. Of course, at light loads and lean mixtures, longer duration of spark may reduce the tendency to misfire because of the additional time allowed for some of the particles of fuel in the lean mixture to move into the spark gap. However, ignition engineers state that wider plug gaps are much more effective in this respect than increasing the duration of the spark. Since suppression reduces erosion and growth of the plug gap, the trend in modern ignition systems is toward wider plug gaps.

Servicing 12-volt Batteries

GENERAL servicing of 12-volt batteries is no different from that required for the 6-volt, though certain precautions must be observed when recharging.

Most charging and testing equipment is designed to handle both 6 and 12-volt batteries interchangeably. However, the supervisor should watch for excessive gassing and flooding as the 12-volt units approach full charge. This can be stopped by reducing the charge rate.

Six-volt fast chargers equipped with a low rate selector switch can be used in emergencies by charging one half of the battery at a time in two successive operations. Care must be used, however, to prevent high charging rates. Twelve-volt batteries should not be charged more than about half the normal rate for 6-volt. When charging one half at a time the connections should be checked to avoid reversal of polarity. Both leads, not just one, must be removed for the second half of the charge. Also the charging rate and time for the two successive operations should be exactly the same in order to retain balance. With thermostatically controlled chargers, both halves of the battery should be charged until the thermostats cut off.

Air Cleaner Service Pays

YOUR air and oil filters may be highly efficient, but they won't stay that way long without attention. It is recognized that service periods must be based upon a score of operating variables, but too

(TURN TO PAGE 14, PLEASE)

TIRE LIFE INCREASED 12 TIMES

Lee Know-How Did It

Here's the story of Tire Service Report #5138. It's the kind of problem that Lee men are working to solve every day.

PROBLEM	RECOMMENDATIONS	RESULTS
Tires blown out within 30 days ***Operation***—Hauling uranium ore in mountains of Colorado ***Equipment***—Dump truck with tandem driving axles ***Axle Loads***—15-18 ton payload ***Speed***—5 to 50 mph ***Roads***—Road hewn out of side of mountain. Very rough sharp stone; bad holes hidden by 12-inch-thick layer of dust ***Tires Used***—10.00-20 12 PR regular highway type tires ***Average Mileage***—All tires blew out or were cut and discarded within 30 days	***Because*** of exceptionally bad road conditions, Lee recommended the same size tire, but an extra ply rating . . . 14 PR in this case. ***Because*** of sharp stones Lee recommended the Lee Cleated Tread Tire. This is specially compounded to resist chipping and tearing and the open tread design doesn't allow rocks to lock in. ***Because*** this tire also has maximum traction, it reduces the spinning and slipping of wheels which tend to cut the tire. The Lee Cleated Tread Tire has a deeply grooved Z-shaped tread with square-cut shoulders to provide traction, either forward or in reverse.	***Tire life increased 12 times*** After 12 months all Lee Cleated Treads were still in service. Previous tires had lasted less than 30 days. ***Time saved***—Hauler has eliminated excessive tire replacements and down time. ***Money saved***—The adoption of Lee's recommendation for the right kind of tire for this kind of job made the operation of this fleet economically possible.

There is no one solution to all tire problems. Lee is working constantly with all kinds of fleets in all parts of the country to give haulers more tire mileage per dollar. Let Lee survey your fleet. Mail the coupon today.

Lee Rubber & Tire Corp., Conshohocken, Pa.

Please send me information about your special engineering survey for truck fleets.

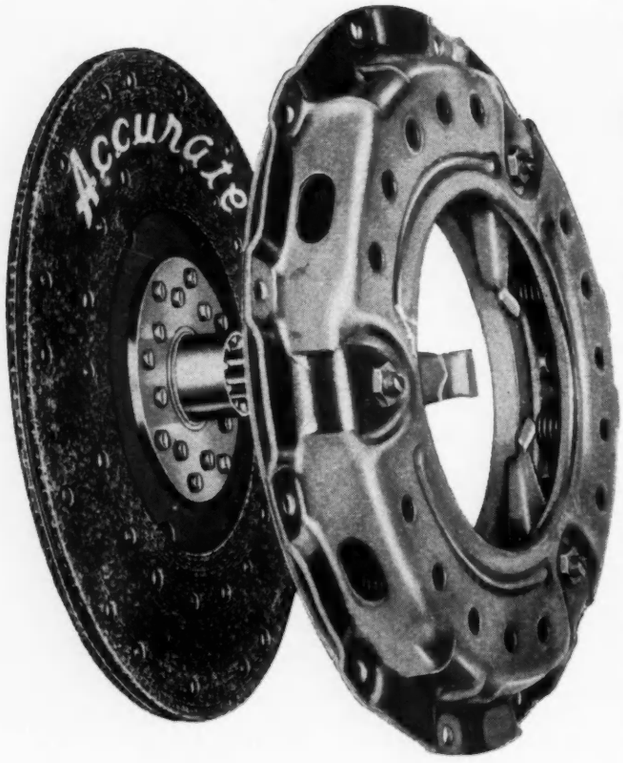
Name_____

Company_____

Address_____

2-E

LEE RUBBER & TIRE CORPORATION LEE TIRES **CONSHOHOCKEN, PA.**



extra miles from

RE-NU Accurate

heavy-duty clutch units

custom remanufactured to your specific needs sold or economically exchanged by your ReNu-Accurate Jobber

WRITE FOR NAME OF NEAREST JOBBER

Accurate Parts Mfg. Co. • 12435 Euclid Ave. • Cleveland 6, Ohio
Replacement Unit Co. • 1505 Rockwell Ave. • Cleveland 14, Ohio

ccj At Your Service

Continued from Page 12

often the attention does not come quick enough to avert the engine wear that follows restricted filters.

If you are experiencing 1. rapid ring wear, 2. cylinder scoring, 3. ruptured bearing surfaces, 4. certain forms of crankcase deposits, look to your filter for the story. Don't overestimate your section of the city or of the country from the standpoint of air contamination.

Dust contamination may vary from .2 to 1.4 grains per 1000 cu ft of air in rural areas, and up to 1.5 grains per 1000 cu ft in industrial areas. This seems inconsequential. However, it should be remembered that approximately 1000 cu ft of air is required for combustion per gallon of gasoline. Thus, if your filters are even 99 per cent efficient, a high volume of contamination will result.

Watch for Vapor Lock

THESE are the days when you may be experiencing vapor lock in the fuel system. Vapor lock is affected by: 1. the volatility characteristics of the gasoline, 2. the temperature and pressure of the gasoline, 3. the ability of the fuel system to handle vapor.

Unseasonably warm days in spring, when winter gasoline stocks are still being marketed, may create vapor lock problems. You will have greater danger of stalling if your fuel system is not maintained to factory specifications. Worn or inadequate fuel pumps, improper location of fuel lines, partially-clogged fuel strainers, leaky gaskets at the fuel filter, defective flexible gasoline lines or small leaks on the suction side of the fuel pump contribute to vapor lock conditions. Excessive restrictions in lines where they make sharp bends, or too small diameter tubing cause trouble when exposed to high temperatures.

Where this condition occurs frequently you can install electric pusher type pumps mounted in the fuel tank, or you can increase the size of the diaphragm pump to lower valve restriction and increase pumping capacity. If the trouble is caused by steady pulling on long grades (a frequent cause), you might richen the air-fuel mixture in a move to eliminate this type of vapor lock.

Automotive School

SUN ELECTRIC CORP., Chicago, has organized three-month courses in complete automotive servicing with emphasis on scientific testing. With one session in progress, other sessions are scheduled to begin the 4th of this month, June 1, June 29, July 27, Aug. 24, and Sept. 21. The courses are being held in Detroit. For further information, write the company's Technical Training Division, Harlem and Avondale Aves, Chicago 31, Ill.

(TURN TO PAGE 18, PLEASE)

WEBSTER

FIRST TO REVEAL THE FACTS YOU SHOULD KNOW ABOUT

Camelback

Fleet Owners deserve to know what goes into the making of the camelback they use and how the proper ingredients serve to produce all-around quality. The Webster Rubber Company is the first camelback manufacturer to reveal *all* the ingredients in its product . . . Webster Certified Tread.

HERE'S HOW WEBSTER BUILDS QUALITY INTO CAMELBACK...

- GRS with a high percentage of Cold Rubber added—for longer wear!
- Highest quality Gas Black — for extra strength!
- Sulphur with Zinc Oxide and Santocure — for fast, even cure!
- Stearic and Paraflux—for better flow!

"Hope to Be Seeing You!"

And Here's What These Ingredients Mean To YOU . . .

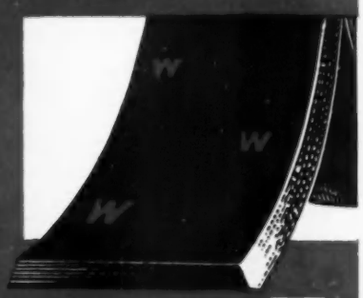
Results of Proper Compounding:

Specific Gravity 1.14
No heavy fillers, reclaim, or weakening agents. Only quality ingredients can produce this figure

Tensile Strength 2400
Achieved only by blending more costly blacks

Elongation 590
Represents a high degree of resilience

Hardness 60
An excellent rating that gives Webster Camelback longer wear



Look for the Cured in Red "W"

Webster's strict quality control and skilled supervision during production assure this same uniform quality in every roll of camelback produced. This quality, plus the famous Websterizing Process gives you the finest recaps money can buy. See your Webster dealer soon, and ask him about his *New Tire Mileage* guarantee!

WEBSTER
RUBBER COMPANY
Warren, Ohio

WEBSTER CERTIFIED TREAD

WEBSTER...A Famous American Name

Paint stripped from 28 ft. trailer in only 45 minutes

Oakite Hot Flow-On Method saves fleet operator $35 per trailer

STRIPPING paint down to bare metal can often prove laborious. Also costly in man-hours—especially when the surface is as big as that of a trailer van 28 feet long. Faced with such a problem, this fleet operator called in the Oakite man.

Here was the kind of job made to order for the Oakite Hot Flow-On Method and Stripper M-3. The Oakite Technical Service Man showed how to apply the stripper solution with the "rake" and then how to recover and recirculate it with a simple trough and pump set-up.

Results: The trailer was stripped bare in 45 minutes. It took only $5 worth of materials. With ⅔ of the original solution still good, plus stripping speed, savings added up to $35 to $45 per trailer.

Proving that—
in industrial cleaning it always pays to call Oakite.

If you have a paint stripping problem, take advantage of Oakite Technical Service without obligation. See a paint-stripping demonstration first-hand. Merely contact your nearest Oakite representative. Or write to Oakite Products, Inc., 26D Rector Street, New York 6, N. Y. for this free helpful booklet No. F-4401.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

Technical Service Representatives Located in Principal Cities of United States and Canada

CCJ At Your Service

Continued from Page 14

Replace Long-Mileage Valves

IT is usually not wise to salvage valves that have operated for long periods of time. The cost of replacement is far less than a road failure, due to defects overlooked during the inspection. You may find no evidence of defects in stem or face, but old valves are likely to contain fatigue cracks that will not show up without special inspection equipment. CCJ surveys show that in a wide range of fleets, valves average approximately 152,000 miles. Don't expect miracles.

Bearing Installation

A RECENT issue of the publication "Lubrication" offers the following suggestions to guide the mechanics when installing engine bearing inserts.

1. Clean all parts. Dirt is a major cause of bearing distress.
2. Measure, do not guess. Be sure the proper size bearings are being installed.
3. Fit. Be sure the bearing inserts are snug in their caps. Check their spread and crush. Do not file the parting edges. Do not use shims unless they are specified.
4. Journal Condition. Dress crankshaft to a fine, lapped finish. Be sure that all wear ridges have been removed. Do not attempt to install bearings on out-of-round or hour-glass-shaped journals.
5. Misalignment. Check alignment of crankshaft and connecting rods.
6. Torque. Set up bearing caps evenly with a torque wrench.
7. Lubrication. Be sure all oil ways are clean and that the oil holes are open when the bearings are installed. Oil new inserts with SAE-50 grade oil.
8. Be sure the sump, oil galleries, filters, coolers, etc., are full of oil before starting the engine.

Burned Breaker Points

WHAT causes burned breaker points? Over 60 per cent of the trouble is caused by excessive voltage And excessive voltage is a result of improper regulator setting, of corroded battery terminals, of defective battery cables, of loose grounds, (sometimes at the engine mounts).

Incorrect cam angle which permits the points to either bounce or stay open too long may contribute to point burning. Defective distributor shaft bearings or misalignment in the shaft may cause the same sort of condition. Improper spring tension permits chatter and eventual burning.

It is a well known fact that crankcase vapors arising into the distributor housing leave deposits which collect dust and eventually burns across the points. Overlubrication of the shaft contributes to this failure in a similar fashion.

To handle payloads profitably BUY CUSTOM-BUILT AUTOCARS

One of nine Autocar units operated by Los Angeles Brewing Co., Los Angeles, Calif. It is a husky Autocar powered by a powerful butane engine.

Your Autocar goes through the production line with your ticket on it calling for a certain motor, transmission, rear end—all the components required for efficient handling of your particular payloads under your particular operating conditions. You can't beat that system. It is bound to result in lower cost per ton-mile hauling. Find out how we can custom build an Autocar for *you*. Clip the coupon.

Autocar Trucks

The Autocar Company, Ardmore, Pa.

Established 1897

Factory Branches and Distributors from Coast to Coast

The Autocar Company, Ardmore, Pa.

I want to hear more about hauling more profitably by using Autocars built for the job.

Name _____

Firm Name _____

Address _____

No. of trucks in fleet _____ **3E**

CCJ NEWS REPORTS

WASHINGTON RUNAROUND

by KARL RANNELLS Washington Correspondent

Recession . . . Not Likely

A business recession is just not in the cards in the foreseeable future for highway transportation or anyone else, according to government experts at the operating levels. A recent Commerce Department survey, based on manufacturing backlogs, indicates that there will be more freight to haul this year than last. Also, serious cuts in defense orders don't seem imminent. A further stretch-out, yes. But Congress is set to resist pressure for drastic cutbacks regardless of Korean developments.

Legislation . . . Nothing Hot

Outlook in late April was that little major legislation affecting transportation would be enacted this session. New Congress, particularly the Senate, is behind schedule. Lawmakers want to adjourn early in July. This means that less important individual bills may get slipped into the assembly line, but controversial measures will go over till next session.

Leasing . . . Fight Continues

Chances were better than even last month, however, that legislation would be enacted which in effect would nullify ICC's prospective ban on trip-leasing. Since the Supreme Court upheld ICC's right to impose such ban, the agency has been studying petitions for exemption. Congressional hearings on legislation (S-925 and H-3203) were scheduled for late April. Agricultural groups are solidly behind legislation which would clip ICC power in this respect. They may get action.

Highjacking . . . FBI Investigates

G-men are moving in to set up greater protective measures against pilferage of interstate trucking shipments. Federal Bureau of Investigation in April began a series of regional conferences with state and local officials. Scheduled discussions: Closer federal-local cooperation, and methods of reducing pilferage ranging from theft of small items to highjacking of trucks.

Small Business . . . New Aid Possible

Chances are good that small trucking outfits and other small business will still be able to get government financial aid in spite of probable liquidation of Reconstruction Finance Corporation. New legislation setting up a powerful "Small Business Administration" is now given an even chance of enactment. It would represent small business before other agencies, have an adequate loan authority.

Budget Cut . . . Likely for BPR

Just how and where the Commerce Department's proposed 15 per cent cutback in its budget is to hit the Bureau of Public Roads was not yet clear in late April. Best bet was that whatever cut is applied would be against administrative expenditures. This could cost the Bureau as many as 700 employees, including engineers and research workers. This would affect highway expansion programs.

But . . . Maybe Not for ICC

Interstate Commerce Commission has asked about $12,000,000 to support its activities during the coming fiscal year. This is $1,000,000 more than it got this year. Talk on Capitol Hill is that ICC may get the amount requested, perhaps a little more. Agency is scheduled for reorganization along lines recommended in the Wolf report, including a general manager for administration. Some influential congressmen favor granting the budget figure or more—on a put-up-or-shut-up basis.

Express Rates . . . Hearings

Interstate Commerce Commission is holding hearings this month in four widely separated cities in connection with the Railway Express Agency's application for a 25 per cent freight rate increase. Hearings were scheduled for San Francisco, Dallas, Chicago, and Washington. Meanwhile, ICC is studying the railroad petition to make permanent the temporary 15 per cent rate increase granted last year.

Gas Taxes . . . Up for Discussion

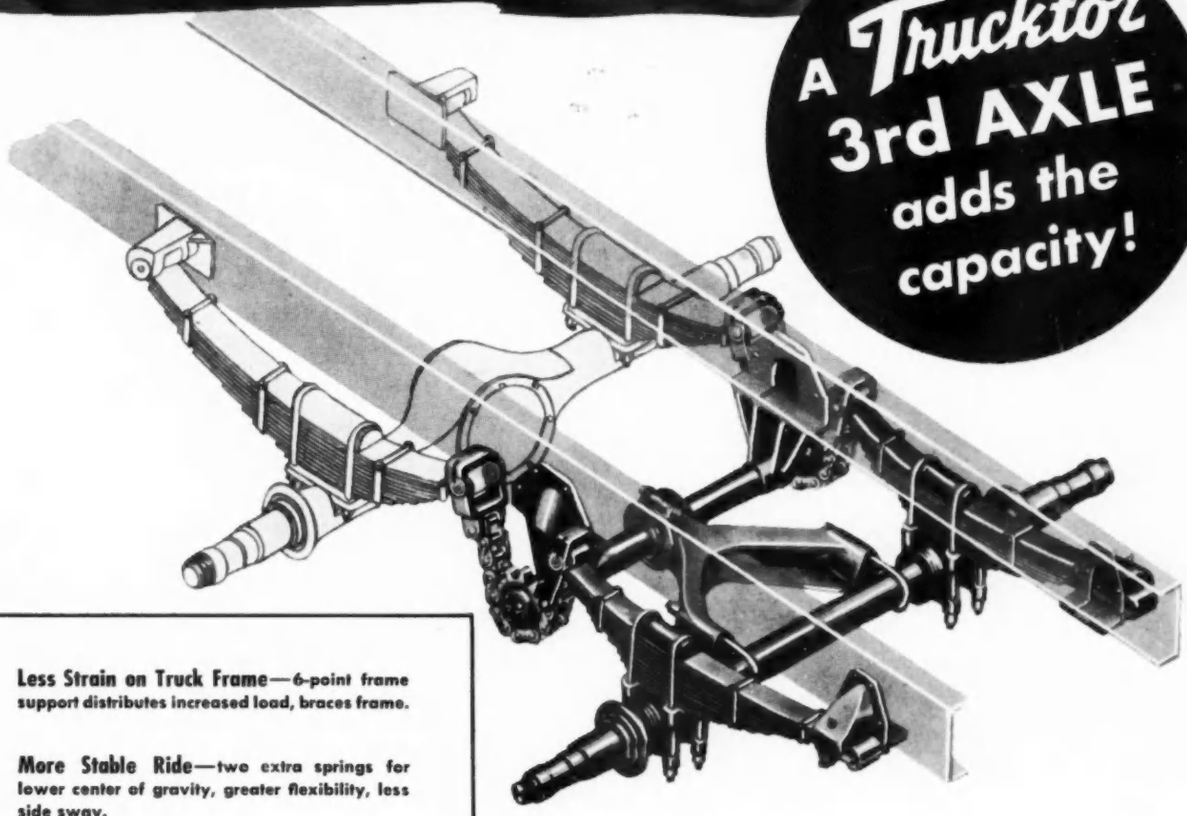
As seemed to be expected, President Eisenhower has announced he will ask Congress to provide for a bi-partisan Commission to work with the Conference of State Governors on matters of overlapping taxation. as well as other matters of state-federal government relationship. Several states and nationwide organizations (CCJ, March pg 62) have passed resolutions asking the federal government to relinquish taxing gasoline and this topic seemed to be assured of a place in any such joint discussions.

New INTERNATIONAL Tanker with

EXTRA PAYLOAD

• International Model R210 with 1600 gal. syrup tank, Trucktor Model HLR Third Axle, 11:00 x 20 tires, 16½ x 6 mechanical air brakes.

A *Trucktor* 3rd AXLE adds the capacity!



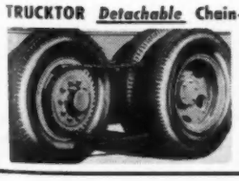
Less Strain on Truck Frame—6-point frame support distributes increased load, braces frame.

More Stable Ride—two extra springs for lower center of gravity, greater flexibility, less side sway.

Perfect Tracking—unique yoke arrangement hauls the trailing axle, absorbs all braking torque.

Less Maintenance—simple, rugged, fewer working parts. Only 8 lubrication points.

TRUCKTOR *Detachable* Chain-and-Sprocket 4-WHEEL DRIVE



Makes tire chains unnecessary. When extra traction is needed, sprocket chains are slipped over sprockets and pinned. Attached and detached quickly, simply, without removing wheels (in picture, wheel removed to show construction).

Available for Most Truck Makes and Models

Convert new or used 4-wheelers with Trucktor Trailing Axles and get up to *double* present payloads. Whatever models you use . . . tankers, vans, stakes, dumps, platforms, tractor semi-trailer combinations . . . you can haul *more* more *safely* if you put *Trucktor* behind the driving axles.

See your Truck Dealer, Trucktor Distributor, or write to

THE TRUCKTOR CORPORATION, Route 22, Mountainside, N. J.

***Safety* IS NO ACCIDENT—*6-Wheelers* ARE SAFER!**

CCJ NEWS REPORTS

DETROIT DISPATCH

by LEN WESTRATE Detroit News Editor

Engine Noise . . . Quieter Now

Truck operators will hear some good news on muffler and exhaust system development from one of the large truck builders before too long. The company tells us it has developed a new muffler so efficient that the exhaust is quieter than the engine noises from the fan and other accessories. It is larger and more costly than those now being used and requires a few changes in the chassis to accommodate it. It will be coming along in a few months.

Truck Tires . . . Without Tubes

Tubeless tires for trucks are getting some consideration by truck builders. Firestone already has announced such a unit and is supplying some of the truck builders with tires for test. Engineers believe adoption of tubeless truck tires will have to come as a factory installation since special wheel and rim are required which would make the cost of a changeover by a fleet operator prohibitive. The tires have distinct advantages, including extreme ease of mounting, and weight savings of about 200 lb on a six-tire rig. Other tire companies are working on the development, but general use of the tubeless truck tire by the industry probably will not come until there are several sources of supply.

Light Trucks . . . No Diesel Engines

We have recently run into rumors that Ford, Chevrolet, and Dodge are going to adopt diesel engines in their larger truck lines. A check with these companies shows nothing like that in the works. One reason is that they would lose the cost advantage they now have from passenger car tooling, since engines would have to be an entirely separate proposition and also sheet metal would have to be altered considerably for the diesel jobs to accommodate the larger engines. Currently, many of the stampings are used throughout the entire truck line. Another factor is that rising taxes on diesel fuel are narrowing the operating advantage of the diesel, particularly for smaller sizes where the gains in economy are not as great in proportion as they are with large units.

Power Steering . . . Moves Closer

Engineers think that the rush to power steering on passenger cars will speed its adoption on trucks because of cost savings accruing from volume production. Most truck builders now are showing interest in the hydraulic linkage booster type power steering assist, which is simpler in design and lower in cost than the more involved integral type. One large supplier is reported to have an air-powered steering unit for trucks about ready for announcement.

Chevrolet . . . No Mid-Year Change

Contrary to reports circulating in the trade, Chevrolet is *not* going to make a model change about mid-year. We have checked and find that there are no plans for a model changeover any earlier than usual, which would mean current models would carry through most of this year.

Brakes . . . Trying to Cool

A lot of work is being done on heat dissipation for truck brakes. One company is experimenting with specially designed wheels on passenger cars to draw air from under the car and across the drum surfaces and may apply this same principle to experimental truck wheels. Another approach by a different company is to build up the metal mass in the drum for greater rigidity to resist distortion and also to absorb more heat than is possible with a thinner drum.

Wire Cord Tires . . . Weight Limits

Highway administrators are taking a look at loading restrictions in respect to wire cord tires. The reason is that the wire cords carry pressures from 100 to 128 lbs compared to a maximum of 80 lbs on conventional cord tires. Most states have two ratings on load restrictions—one for pneumatic tires and one for solid rubber. Apparently there is some thought of establishing a rating for wire cord casings somewhere between the other two.

Truck Prices . . . Won't Go Up, Anyhow

Competition for new truck sales is rugged right now and everyone expects it to get much more bitter as the year wears on. The reason is not any particular falling off in demand but rather a flood of trucks from the production lines which currently are running at the rate of 1.5 million units a year. Sales managers duck the question whether current prices will hold but admit there always is a difference between list and actual selling price in highly competitive periods. No one as yet has indicated any intention of following the $40 average price cut by Dodge, but about the only thing fairly certain is that nobody is going to raise prices.

Autocar

One of the many leading engine manufacturers to select and distribute Perfect Circle's 2-in-1 chrome piston ring set for authorized replacement service

2-in-1 is the truly modern piston ring equipment, controls oil—seals compression for over twice as long as ordinary sets. Solid chrome protects both oil rails and top compression rings against wear. And only 2-in-1 offers a choice of spring pressures with each oil ring to meet any cylinder wear condition.

For sustained power and positive oil control for thousands of extra miles, always install Perfect Circle 2-in-1 piston ring sets. Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., Toronto, Ontario.

Perfect Circle

PISTON RINGS The Standard of Comparison

CCJ NEWS REPORTS

MAY ROUNDUP

by ERNIE FOREST Assistant Editor

Magnesium . . . Moves Closer

Truck bodies from sea water are moving closer to possibility. At least one company, White Metal Rolling and Stamping Corp., New York City, was reported to be setting up a division to handle production and sale of all-magnesium truck bodies. A prototype unit by the company was on display at the recent International Magnesium Exposition in Washington, D. C.

Other magnesium-made items at the show included an Air Force radar unit housed in a full trailer. About 20 by 8 by 7 ft in size with two axles and eight wheels, one man pulled it around the show floor. Magnesium trailer brake assemblies were reported to save 71 lb per axle. And an experimental trailer was said to offer 20 per cent increased payload.

Technically magnesium weighs about one-fourth as much as steel and has about two-thirds the tensile and yield strength. A dockboard of magnesium on display designed for 30,000 lb, measuring 4 ft long, weighed 90 lb.

Future development of the metal was encouraged by an Army announcement at the show of an "HAE" coating process designed to protect the metal from corrosion, abrasion and wear and to provide it with heat insulating properties.

Chief use to date for magnesium has been in aircraft, and production has been limited—106,000 tons last year. But with 12 billion lb in every cubic mile of sea water, production probably could be increased to supply any demand. Pricewise, it costs about 27¢ a lb, is cheaper by volume compared to aluminum's price of about 21½¢ a lb.

Accidents . . . Down

Truck and bus fleet accidents decreased again in 1952 according to reports from the Travelers Insurance Companies. Trucks were involved in 21.5 per cent of fatal accidents and 11.7 per cent of non-fatal accidents last year. In 1951, the truck record was 21.8 per cent of fatal accidents and 12.2 per cent of non-fatal accidents.

Buses in 1952 are shown as involved in 1.3 per cent of fatal accidents and 2.0 per cent of non-fatal accidents as compared to the 1951 record of 1.5 per cent of fatal accidents and 2.0 per cent of non-fatal accidents.

On a basis of exposure, the 1952 record for bus and truck fleets is almost directly comparable to and far ahead of the passenger car showing—involved in 74.0 per cent of fatal accidents and 82.0 per cent of non-fatal accidents—because, while there are about four times as many cars, commercial vehicles put on nearly four times the mileage of the average passenger car.

Sidelight on this overall picture was provided by a report from the National Automobile Transporters Assn., showing a 1952 accident rate of 1.01 per 100,000 vehicle miles, a 25 per cent drop from the record for 1951.

Tonnage . . . Up

A 7 per cent increase in the fourth quarter of 1952 over fourth quarter of 1951 resulted in a 0.4 per cent increase in intercity truck tonnage in 1952 as compared to 1951. Decreases were recorded of 4.0, 3.0 and 0.6 per cent for the first, second and third quarters respectively, of 1952 when measured against 1951.

American Trucking Assns. intercity truck tonnage index, based on 1941 as 100, stood at 247 for 1952.

On a regional basis gains in 1952 over 1951 were recorded by the Rocky Mountain area—9.7 per cent, South—9.5, Southwest—7.5, Pacific—4.1, New England—2.3, and Midwest—1.0. Decreases were reported in the Middle Atlantic and Central areas of 3.0 and in the Northwest—1.4.

Refrigerated liquid carriers boosted their 1952 total to a 23.3 per cent increase over 1951. Other types of carriers reporting increases in 1952 as compared to 1951 included: refrigerated solids—16.8 per cent, household goods—6.8, heavy machinery—12.2, liquid petroleum—5.0, and building materials—7.2. Decreases in 1952 as compared with 1951 were recorded for general commodity carriers—0.6 per cent, agricultural commodity carriers—5.7, other specialized carriers—3.3, and motor vehicle transporters—11.0.

TAA . . . Report Submitted

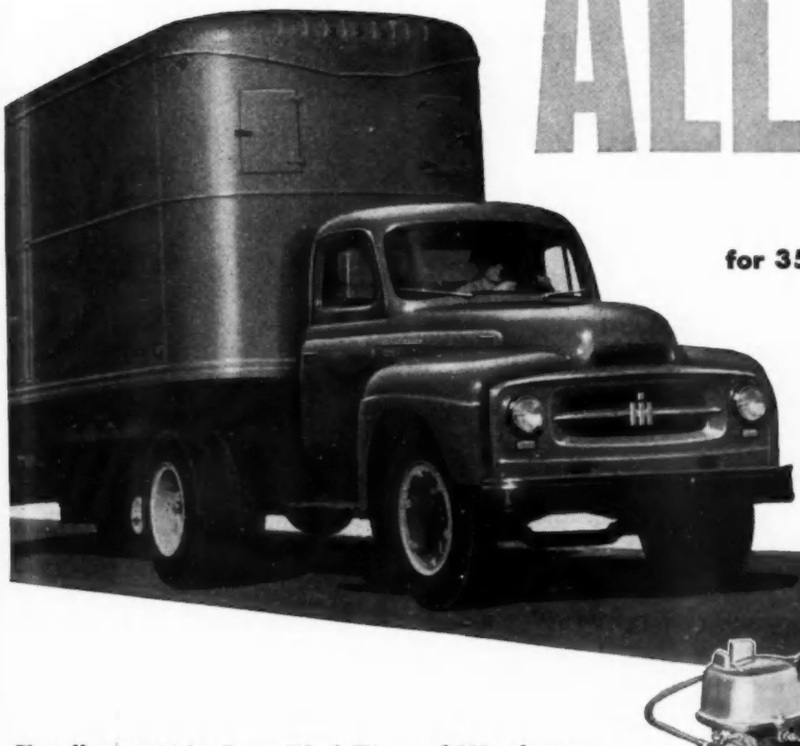
Trucking industry groups—and groups in all other forms of transportation—are busy analyzing the long awaited report from the Transportation Assn. of America recently submitted to Congress. Four years in the making, 260 pages long, and available at $6 per copy from TAA, it will probably satisfy no one part of the industry. Private motor carriers especially will give it a careful searching (CCJ, Feb. pg 62, Mar. pg 62 and April pg 62).

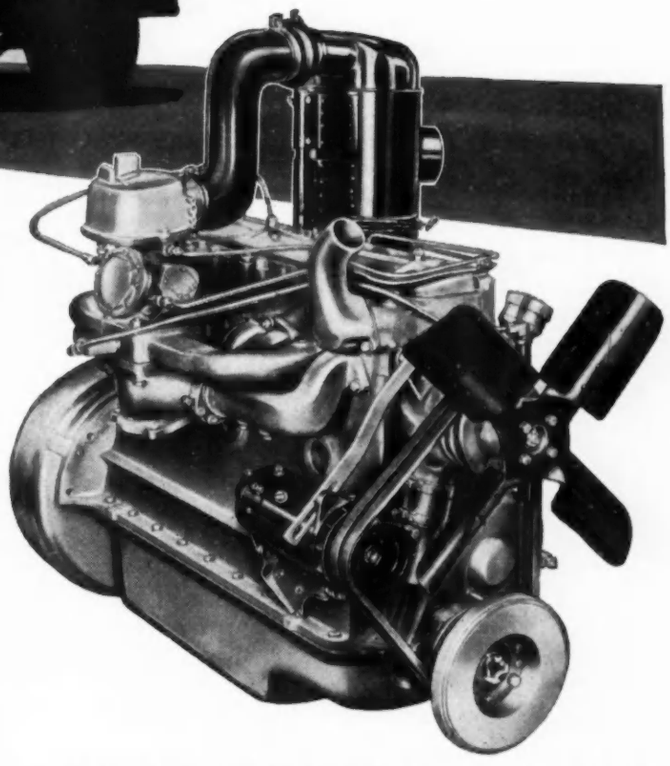
Meanwhile, TAA's Policy Administration Board was drafting legislation to give effect to the report and TAA itself was busy on another report dealing with federal administration and promotion of transportation.

(TURN TO PAGE 202, PLEASE)

ALL NEW!

30% More Power
for 35,000 pounds GCW Tractors!





The all-new 130 hp Super Black Diamond 282 valve-in-head engine is now offered in the new International R-175 ROADLINER (GCW 35,000 lbs.). The new engine develops *30% more horsepower* than the engine previously offered in this size model. It is available with gasoline or LPG fuel system.

Sets a new standard. Once again, International offers an engine that delivers more power where you need it—for pick-up, over-the-road speed, grades. The Super Black Diamond 282 sets a new standard for operating economy and low-cost maintenance.

To make tough hauls easier and more profitable, the new R-175 includes such additional new features as . . . an improved cushioned-disc clutch which greatly increases lining life . . . an improved cab mounting for a more stable ride . . . new carburetor . . . increased capacity generator. These and many other features make the new R-175 ROADLINER a top performer with *lowest* total costs.

Let your nearest International Dealer or Branch give you full details on new laboratory-proved, road-proved, owner-proved International trucks.

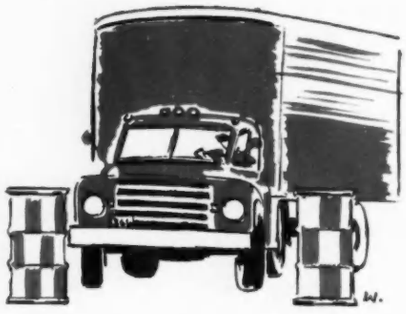
New Super Black Diamond 282 engine delivers exceptional efficiency and economy with: 6.5 to 1 compression ratio . . . 246.3 lb. ft. torque at 1,800 rpm . . . visible flow downdraft carburetor . . . self-cleaning exhaust valves . . . copper-chrome alloy iron cylinder block . . . high alloy cylinder head with larger streamlined intake channels and ports . . . and many other new features.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

International Harvester Builds McCormick Farm Equipment and Farmall Tractors . . . Motor Trucks . . . Industrial Power . . . Refrigerators and Freezers

Better roads mean a better America

INTERNATIONAL TRUCKS
"Standard of the Highway"



SKILL ± ATTITUDE = DR

Accidents, like VD, can be prevented. Here are specific recommendations for improving the safety picture — education, corrective treatment, improved safeguards, incentives and discipline. They all add up to better ATTITUDES

By Donald S. Buck

Traffic Safety Engineer, Department of the Army, Washington, D. C.

NAPOLEON once said: "There is no such thing as a poor soldier; just poor leaders." I wouldn't want to be in the position of saying that exactly the same relationship can be applied between truck drivers and their supervisors, but my thinking is that the analogy is pretty close. Fleet operators with good driver training programs and good leadership, particularly among safety personnel, by and large have far better records than those which have poor training programs and poor leaders.

There is one big difference, however, in the analogy. The platoon leader is nearly always with his soldiers, whereas the driver supervisor is not. Hence, in this respect driver supervisor's job is the more difficult, and to be successful he must make the best use of all his opportunities. When he is actually instructing or supervising his drivers, he should make every effort to make his points interesting and dramatic so that the driver will remember them on the road. To insure this, he should be using all the tools at his disposal including such major categories of the profession as driver selection, initial training, corrective retraining, and particularly, incentives.

In considering the approaches to driver improvement and its invariable attendant accident reduction, I cannot over emphasize the importance of proper *attitudes* on the part of drivers. This is a subject that I have discussed often in the past, but the headline to this particular article suggests a slightly different twist.

One driver may be extremely proficient in the skills involved in his driving tasks, yet because of improper attitudes his performance will be poor and his accident rate high. This seems characteristic of the "kid" driver, the "hot-rod" cowboy. Another driver, sometimes with less inherent skill, but with the right attitude can turn out an exemplary performance. This is characterized by some older drivers, who, though vision may be poorer or reaction time slower, manage to drive more safely than their more skilled colleagues.

Perhaps the quickest and simplest way to analyze proper attitude is the axiom that "*unsafe drivers expect the best* whereas *safe drivers expect the worst.*" Consider how often those reporting accidents prepare their remarks with "I didn't expect"—or "suddenly, to my surprise"—or "I

DRIVER PERFORMANCE

didn't believe —." It is the old idea of defensive driving.

As we explore some of the techniques which improve drivers, let's remember that all of them bear in some way or another on attitude. We should also remember that it is almost impossible to find anything definitely new on the subject of driver training that has not been said time and time again. The trick, for supervisor and author alike, in new ways to simplify recognized and effective methods, is to find new approaches to the old problems, and the new ways of inspiring ourselves as well as our drivers in the vitally important and always continuing job of reducing accidents through driver improvement. For example, have you ever sought some logical proof that accidents really *can* be prevented? I found it just the other day.

VD and Accidents

IT was in Eisenhower's book "Forty-eight Million Tons to Ike." In it he quotes some amazing facts about venereal disease.

During a thirteen-month period in World War I, 18,000 men were lost daily to VD. This amounted to a total loss during the period of 7,700,000 man-days. During a similar period of World War II there were only 606 men lost per day and a total of 221,000 man-days.

What has this to do with accidents? VD is an accident. It is unintentional; unforeseen; may result in injury; *and can be prevented.*

Here's how the army reduced the rate by 97 per cent:

1. Education—outlining the cause, consequence and prevention.
2. Treatment—improved for VD and for accidents.
3. Improved safeguards and required use.
4. Discipline—punishment of violators (and this is a last resort).
5. Making the commander (i. e., the driver-supervisor) responsible.

To this list I would like to add a sixth heading which perhaps we should call number 1-A. It is *incentives.* It consists of teaching the individual "What is there in it" for the soldier (or the driver) to stay out of trouble in the first place. Give a man a sound reason, outline its advantages to him, and the battle of attitudes is half won!

Surely there is no reason why all six of the principles of the VD program cannot be applied to accident prevention among fleet operators.

Three-Prong Education

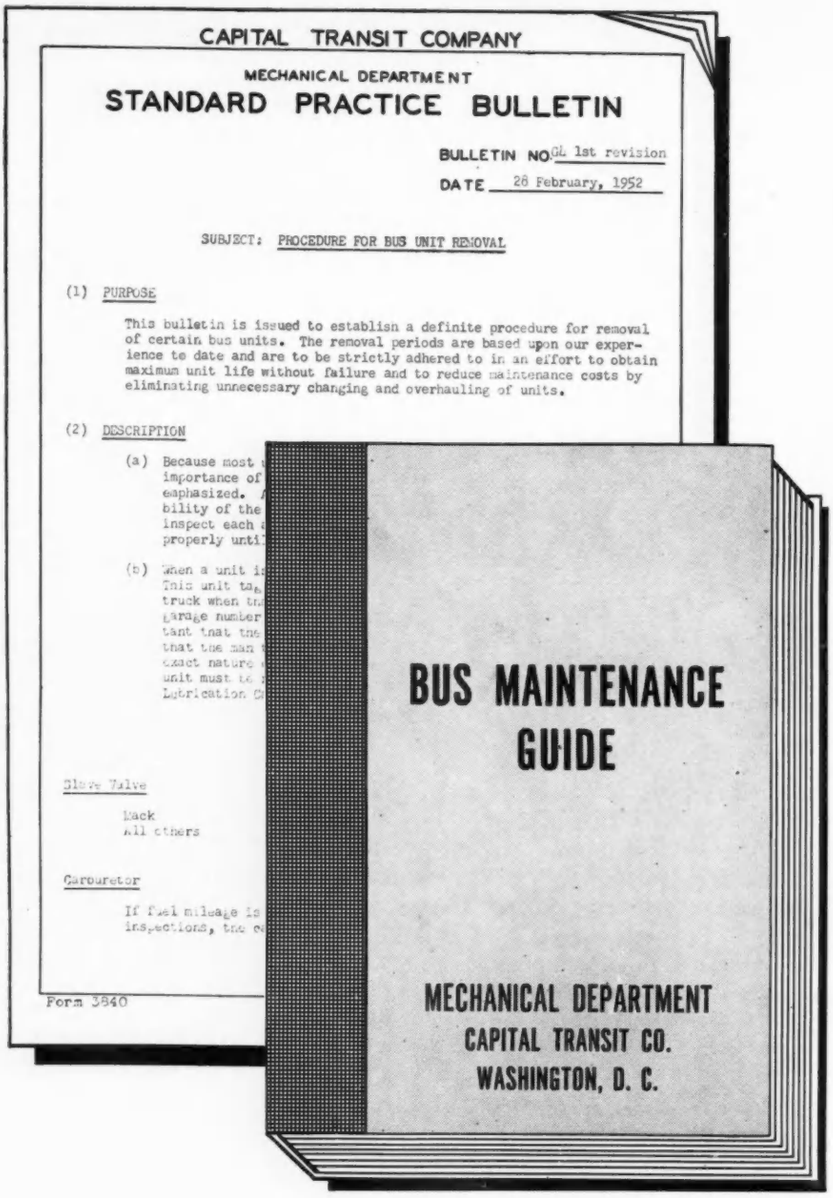
THE first is education which here, of course, means driver training. But sometimes we are prone to forget that there are three specific types of driver training. First there is the initial training for beginners. Here, the man is taught how to drive, to steer, stop, etc. Second there is refresher or group reorientation training for the more experienced driver. This is a continuing program generally applied to the group by means of meetings, films, posters, etc. Third there is the remedial training, specifically trailored for the individual and his problems, which we will discuss further under the heading of treatment.

How can training be made more effective? To me, two of the biggest keys to successful training are, 1 *making it interesting* and 2 *make it short.*

How can we make it more interesting? If you are teaching a driver how to back, you can set up a minimum type obstacle course, featuring offset alleys, docks, and other backing problems, which can be accomplished in any open area with a few discarded 55-gallon drums, or some 2 x 4 stanchions. It is a whole lot better to let your drivers learn to back by hitting a few of these than by hitting other vehicles on the road. If you make the course tough enough, it will be a real challenge to the drivers' skill and ability. The ATA Roadeo, now a nationally famous contest for professional operators of trucks, is an excellent example of this

(TURN TO PAGE 114, PLEASE)

Condition Ma


CAPITAL TRANSIT COMPANY

MECHANICAL DEPARTMENT

STANDARD PRACTICE BULLETIN

BULLETIN NO. GL 1st revision

DATE 28 February, 1952

SUBJECT: PROCEDURE FOR BUS UNIT REMOVAL

(1) PURPOSE

This bulletin is issued to establish a definite procedure for removal of certain bus units. The removal periods are based upon our experience to date and are to be strictly adhered to in an effort to obtain maximum unit life without failure and to reduce maintenance costs by eliminating unnecessary changing and overhauling of units.

(2) DESCRIPTION

Form 3840

BUS MAINTENANCE GUIDE

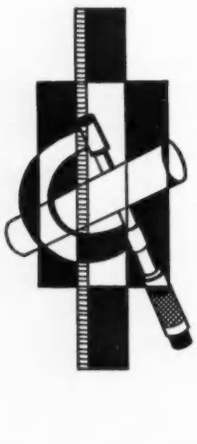
MECHANICAL DEPARTMENT
CAPITAL TRANSIT CO.
WASHINGTON, D. C.

Above. Standard practice bulletins of this type provide detailed information on specific jobs, are distributed to key personnel in all garages. Inset. Bus maintenance guide provides nearly all data and specifications mechanic will need

Head inspection mechanic examines a bearing to check on the wear pattern

Tags go

Inspections provide more accur



By James F. Kirk
Automotive Engineer, Capital Transit Co.

I LIKE MOST bus properties we at Capital Transit are continually shooting for higher maintenance standards. We want more miles from our maintenance dollar, and we know that to enjoy an actual saving you must not only improve the level of your work but you must do that work volume with less people on the payroll. Our present program has accomplished both objectives. We find that a belt-tightening program need not inflict a higher workload on any individual. On the contrary it will make his work easier while providing for better maintained vehicles—if it is intelligently administered.

We think we are well on the road to an answer to high maintenance costs with a program we call the "Condition Maintenance Theory." This continuously evolving program has as its objective the extending of parts life to the very ultimate without endangering our service through road failures and without incurring undue damage to those parts and

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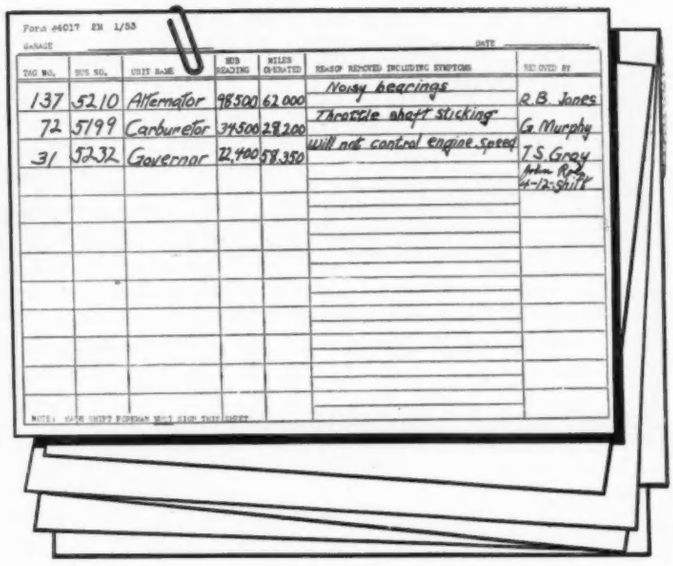
Maintenance Extends Parts Life

Tags go with removed units, show specifically why it was considered defective



Form 64017 EN 1/53

GARAGE DATE

TAG NO.	BUS NO.	UNIT NAME	BUS READING	MILES OPERATED	REASON REMOVED INCLUDING SYMPTOMS	REMOVED BY
137	5210	Alternator	98500	62 000	Noisy bearings	R B Jones
72	5799	Carburetor	34500	29 200	Throttle shaft sticking	G Murphy
31	5232	Governor	72,400	58,350	will not control engine speed	T S Gray Johnson Rpr 4-12-Shift

NOTE: EACH UNIT REMOVED MUST HAVE TAG ATTACHED

Control sheet for front office shows tag number, bus number, mileage and cause of unit removal

accurate estimates of parts life than arbitrary mileages for Nation's Capitol bus fleet

assemblies. Long ago we discarded the practice of arbitrarily replacing units on a mileage basis. Former programs seemed to be lacking in a practical answer to expected parts mileages. Inspections set up originally revealed that many units that were replaced on an arbitrary mileage basis were perfectly good for more mileage. And conversely we found that road failures mounted when units were left too long beyond their correct wear-out point.

Under the condition theory we remove or replace units only when an inspection reveals that they should be removed. If the periodic inspection indicates that a certain part will not operate trouble-free until the following mileage inspection, the unit is replaced without regard for mileage.

This may appear to be a rather basic approach. Certainly it is obvious that an intelligent inspection should guide repair practices rather than arbitrary mileage. However, the program is easier explained than followed, mainly because its success depends upon the element of good judgment of the inspector. That it has proved economical and practical is attested by figures which show that we have improved parts mileages during the short time the condition maintenance theory has been in existence.

Head Inspection Mechanic

A CONTINUOUS training program for inspectors, as well as drivers and foremen is a requisite of this program. It requires competent supervision by men trained in cost problems as well as in mechanics. And it necessitates a high degree of cooperation between the maintenance shop and the transportation department.

The chief inspector is a very important man under the condition theory of maintenance and his title is Head Inspection Mechanic. This man must have ability to receive in-

(TURN TO NEXT PAGE, PLEASE)

Assistant supervisor of garages inspects simplified wiring arrangement of treadle-operated doors. This display, with others like it, is used in instruction

C. T. CO. BUS CONDITION REPORT

To be turned in for every bus used

CHECK OR PUNCH OPPOSITE DEFECTS

BUS NUMBER 3518 DATE 10-12-52 RUN NUMBER 223

OPERATOR'S BADGE NUMBER 2403 OPERATOR'S NAME [illegible]

ENGINE	CLUTCH	TRANSMISSION	STEER	ELECTRICAL	BRAKES	FRONT DOORS	REAR DOORS	LIGHTS	CHASSIS	BODY
Knocks	Grabs	Noisy	Hard Steering	Generator Not Charging	Air Press. Too High	Wrong Speed	Wrong Speed	Headlights Out of Focus	Out of Line	Floor Boards Loose
Runs Hot	Slips	Hard to Shift	Shimmy	Starter	Air Press. Too Low	Hang at Times	Sensitive Edge Faulty	Headlight Out	Weak Springs	Floor Covering
Runs Cold	Won't Release	Gears Rake	Loose Steering	Horn	Air Leaks on Application	Won't Close All the Way	Won't Open	Dome Light Out	Wheel Lugs Loose	Seats Loose
Misses	Chatters	Jumps Out of Gear		Battery	Pull Left	Won't Open All the Way	Sticks Open	Sign Light Out	Tires	Seat Covering
Backfires	Pedal Bound	Won't Shift to High		Front Heater	Pull Right	Control Valve Leaking	Interlock Not Correct	Marker Light Out		Driver's Seat
Idles Too Fast	Pedal Hard	Won't Shift to Low		Rear Heater	Too Sensitive		Won't Close All the Way	Step Light Out		Glass
Idles Too Slow		Gears Rake Into High		Ventilation	Foot Brake Slack		Won't Open All the Way	Tail Light Out		Windows Hard to Raise
No Power		Gears Rake Into Low		Too Hot	Hand Brake Slack		Opens With Front Closed	Stop Light Out		Handrails & Grab Rails
Low Oil Pressure		Shifts to High Too Soon		Too Cold	Do Not Release			Fare Box Light Out		Windshield Wiper
Water Leak		Oil Temperature High		Defroster				Directional Signal Out		Roof Leaks
Oil Leak		Oil Pressure Low		Buzzer System						Ventilators
Exhaust Leak										Destination Signs
Fumes										Mirror
Accel. Sticks										Speedometer
Accel. Stiff										Fire Extinguisher
Hard Starting										
Won't Take Gas										
Cuts Out on Pull										

PLACE REMARKS ON REVERSE SIDE

FORM 508371

Drivers fill in this condition report after each trip, thereby giving mechanics a clue to possible troubles

Condition Maintenance . . .

Continued from Page 67

struction and to give instruction to others. He receives help from our assistant supervisor of garages, and he is guided in his decisions by a Bus Maintenance Guide. Periodic standard practice bulletins also provide information upon which to base his decisions.

The head inspection mechanic is a first grade mechanic who receives a higher rate by reason of his responsibilities. His sole job is to supervise the inspection teams and pass final judgment on units to be removed and replaced. It is on him that inspection teams rely for borderline case judgment.

Guideposts to Inspection

BECAUSE the head inspection mechanic carries responsibility for the condition of buses and workmanship of his mechanics and their helpers, we make available to him special training and instruction. Vendor representatives when they are in town work with our head inspection mechanics. They get the benefit of discussion of conditions and findings of the assistant supervisor of garages. Technical personnel keep them informed of new practices. New facts and developments learned by our automotive engineers are passed on to them. A close liaison exists between them and the engineering section for they watch special tests carried out on buses.

The Bus Maintenance Guide is very important in providing standardized specifications and adjustment data as well as wear limit data to the inspection teams. This is a pocketsize booklet designed to slip into the mechanic's coverall pocket, where it is available at all times. While this does not take the place of a manual, it does provide handy information that will be needed for making quick and accurate decisions during inspections. Adjustment data for every make and model bus in our fleet is found here. It is only a matter of turning to the proper tables to find bearing adjustments, slack adjuster settings, regulator settings, tensions, capacities, wiring diagrams. Causes and effects of common bus troubles are also outlined here.

Another guide for the inspectors is our standard practice bulletin. These consist of up-to-date condition service aids on new models, model changes, or approved techniques for overhaul. In other words, whenever we feel that additional information is required in handy form, we set up a condensed, easily-read and easily followed technique so that all equipment will be maintained to this standard.

Control of Inspection

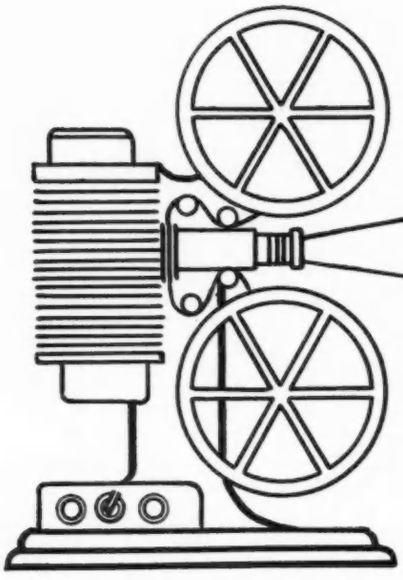
A SPECIAL form is used when a unit fails because of inattention or improper workmanship. This information is conveyed back to the garage foreman and to the supervisor of automotive equipment. And a quick followup is made so that the correction can be made before further damage is done.

Likewise a similar form is used

(TURN TO PAGE 128, PLEASE)

Better public relations and more adequate highways—two top subjects for bus and truck fleetmen today — conclude Commercial Car Journal's selected film list for truck and bus fleet operators. (Part 1, Mechanic Training Films, appeared in February and Part 2, Safety Training, in March.)

This list, Part 3, is designed to help you take advantage of every opportunity to show the public the importance of truck and bus operation and the value of better roads in today's economy. Show them at your local Rotary, Kiwanis, Lions, etc.—benefit your community and yourself.



Public Relations, Highway Films

FILMS in this list have been arranged alphabetically by title under the following headings:

1. Public Relations.
2. Adequate Highways.

Select the one that best fills your need. All but one of the 16 mm films listed are available without cost—you pay only transportation and insurance. The others carry a nominal rental charge. Projectors for showing them can usually be rented in any city at low cost. Films should be ordered as far in advance as possible.

Following the title of the film is the running time, a brief description, whether free loan or rental, and a numerical reference to the source list (see column 3).

Public Relations

GENTLEMEN OF THE HIGHWAY —10 min—describes the training, the qualifications, the vehicles and the daily routine of a bus driver. Free loan—1.

HORIZONS UNLIMITED—17 min —graphically shows the importance of truck transportation in our everyday living. Includes scenes of many different types of trucks. Free loan—4, 8, 9, 10, 14.

OIL—THE INVISIBLE TRAVELER —20 min—shows how oil and oil products are transported from the well to the consumer, including many illustrations of tank trucks at work. Free loan —12.

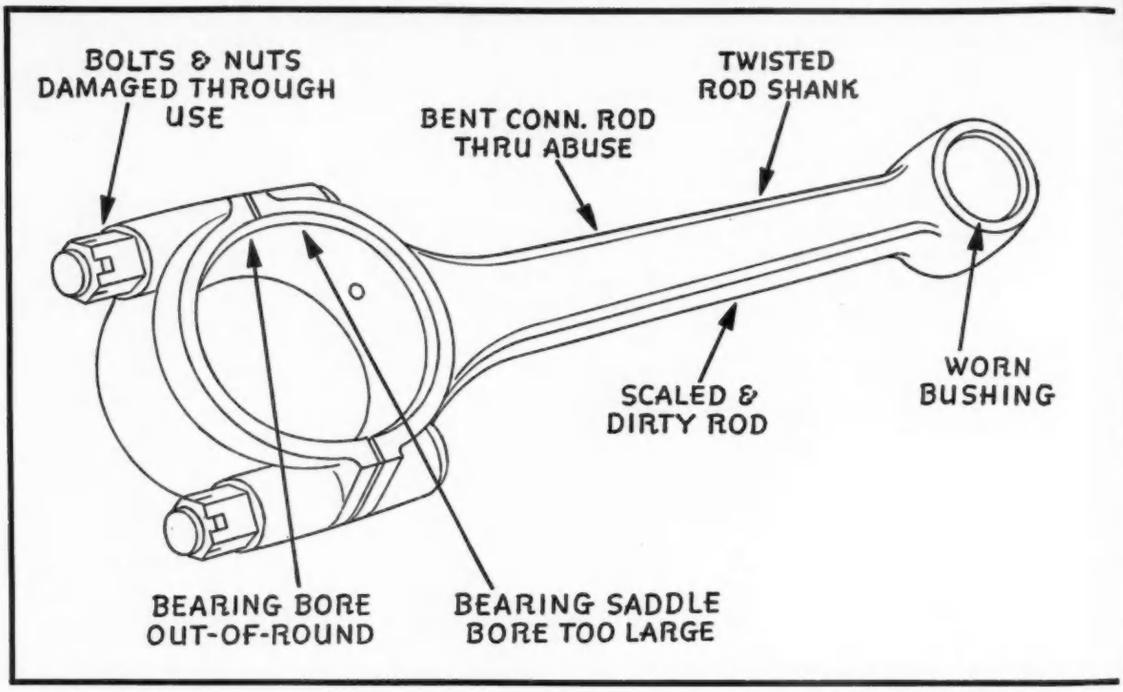
PIPELINE ON WHEELS—26 min —shows how the modern tank truck is a strong, carefully engineered vehicle for safe transportation of gasoline and other liquids. Free loan—7.

A PROFESSIONAL PORTRAIT— 22 min—shows how professional truck drivers "keep 'em rolling" safely, skillfully, considerately, and how their work brings us the things we need and use. Free loan—4, 9, 10.

(TURN TO PAGE 102, PLEASE)

SOURCES

1. Affiliated Aetna Life Cos.
   Motion Picture Bureau
   151 Farmington Ave.
   Hartford 15, Conn.
2. Allied Chem. & Dye Corp.
   Paving Materials Sales
   The Barrett Division
   40 Rector St.
   New York 6, N. Y.
3. American Assn. of State Highway Officials
   917 National Press Bldg.
   Washington 4, D. C.
4. American Trucking Assns., Inc.
   Public Relations Dept.
   1424 Sixteenth St., N.W.
   Washington 6, D. C.
5. Association Films
   347 Madison Ave.
   New York 17, N. Y.
6. Caterpillar Tractor Co.
   Peoria 8, Ill.
7. The duPont Co.
   Petroleum Chemicals Div.
   Rockefeller Center
   Suite 1810, RKO Bldg.
   New York 20, N. Y.
8. Farm Bureau Mutual Auto Ins. Co.
   Safety Department
   246 North High St.
   Columbus 16, Ohio
9. General Motors Corp.
   Department of Public Relations
   Film Section
   New York City and Long Island
   1775 Broadway
   New York 19, N. Y.
   Eastern States
   General Motors Bldg.
   Detroit 2, Mich.
   Western States
   508 San Francisco Bank Bldg.
   405 Montgomery St.
   San Francisco 4, Cal.
10. National Highway Users Conference
    National Press Bldg.
    Washington 4, D. C.
11. Pacific Intermountain Express
    Public Relations Div.
    299 Adeline St.
    Oakland, Cal.
12. Shell Oil Co.
    Film Library, Room 4226
    50 West 50th St.
    New York 20, N. Y.
13. Tomkins Films
    1044 West Edgeware Rd.
    Los Angeles 26, Cal.
14. The White Motor Co.
    Sales Promotion Dept.
    842 East 79th St.
    Cleveland 1, Ohio


BOLTS & NUTS DAMAGED THROUGH USE
BENT CONN. ROD THRU ABUSE
TWISTED ROD SHANK
SCALED & DIRTY ROD
WORN BUSHING
BEARING BORE OUT-OF-ROUND
BEARING SADDLE BORE TOO LARGE

Here's what can happen to a connecting rod. Check all factors before replacing

Don't Spare the Rods . . . or You'll

Check the connecting rods for shank misalignment, bore wear, cap cock, and

By Walter Thill
Federal Mogul Corp.

TOO MANY engines are reconditioned today without giving the connecting rods a thorough inspection before putting in new insert bearings. Today's high speed, high compression engines operating under heavy loads and under burdensome traffic conditions will not take this kind of treatment very long.

No, every engine you rebuild may not have faulty connecting rods, or main bearing saddles for that matter, but how do you know? The first thing that can happen if you do not check your jobs is to have a rod go out on one of the newly "rebuilts" and have the driver call in for a tow just when you cannot afford to be without that unit. This makes the oversight costly.

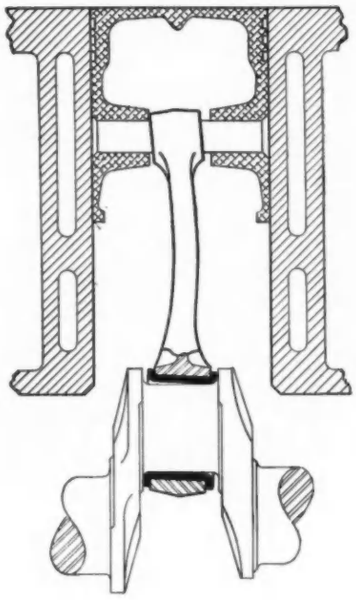
Probably no other sub-assembly in an engine is so unintentionally slighted as the connecting rod; probably because it is of rugged appearance and construction, and there are many of them. Experienced mechanics know that many parts can be in bad need of reconditioning without visual defects. Here is what can go wrong with a connecting rod in the order of frequency in which it happens:

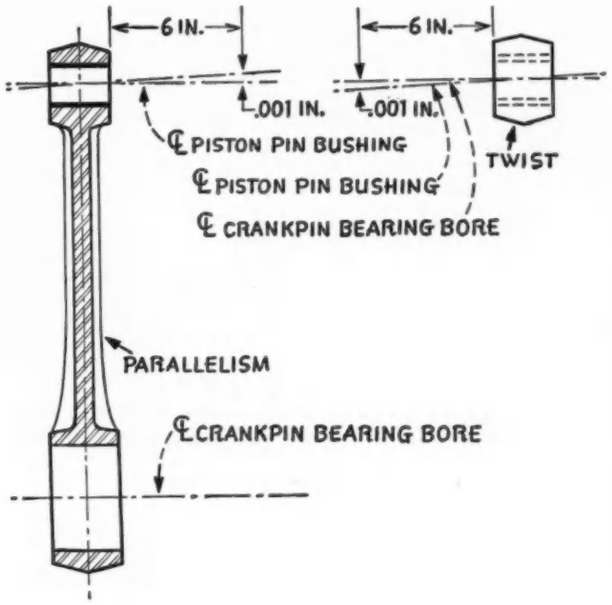
1. The big end bore becomes out-of-round.
2. The big end bore becomes enlarged.
3. The shank becomes twisted.
4. The shank becomes bent.
5. The pin bushing becomes worn or poorly fitting.
6. The rod cap becomes cocked.

To understand how such inaccuracies can develop requires a review of the work that is done by the connecting rod itself. The rod, as you know, converts the energy set up in the explosion and expansion of the gases in the cylinder into rotation. It does this by virtue of the eye end being connected to the piston, which produces a direct downward thrust, and the big end to the crankpin.

The load that passes through the rod is sizable. After all, when this load is multiplied by the number of cylinders, it equals the total power of the engine. In a 4 x 5 engine, using

(TURN TO PAGE 106, PLEASE)



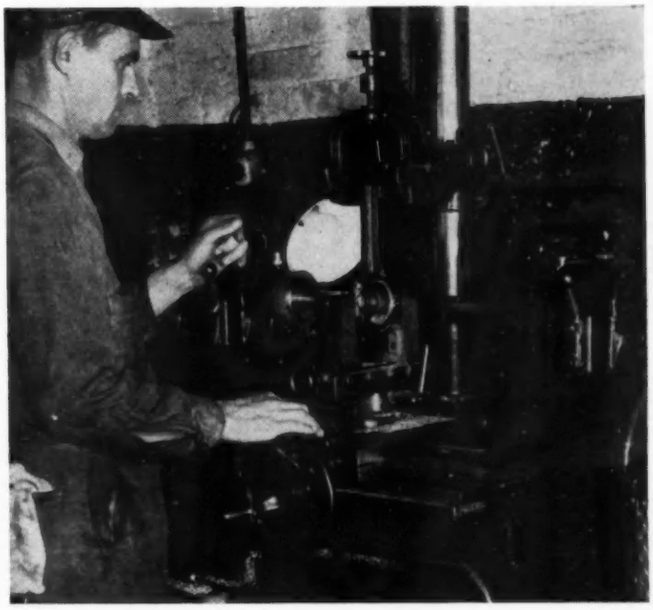


Shank misalignment causes improper bearing contact at pin as well as at the crankshaft

Check for misalignment—parallelism and twist before reuse. Here are minimum tolerances

Ruin the Engine

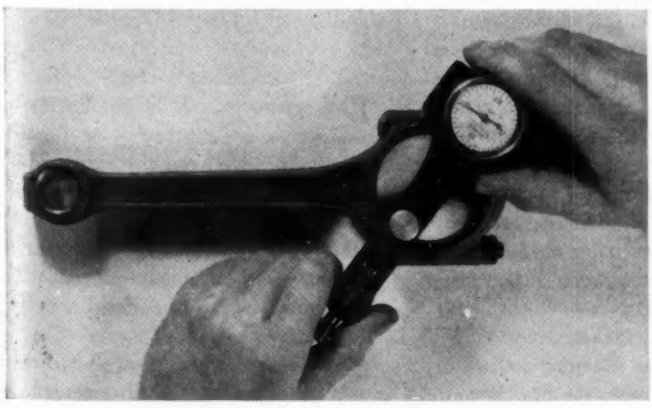
cracks before reconditioning

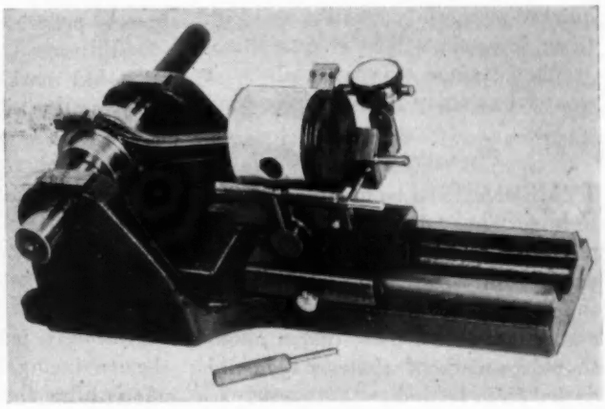


Right. Rods are carefully aligned before bearings are fitted. A precision job insures long rod mileage

Below. Any one of several tools will check rod bore for roundness. This type dial indicator is accurate

Below, right. Rod aligning jig consists of bearing fixture on spindle, aligning face and dial indicator. Alignment is performed while assembled to piston





Prove Your Point—With a Photograph

Court cases, insurance claims, safety training—pictures present the facts, save fleetmen dollars

A CHILD'S scream and the shrieking of brakes focuses the attention of passers-by upon a tiny body lying near a big trailer rig, its engine idling gutturally. The boy has been hit by one of your trucks, but, luckily, he was struck a glancing blow by the front bumper and will recover speedily.

Circumstances seem to be on your side, too. Witnesses say that the youngster darted into the truck's path without warning, and your driver claims that he was traveling only 15 mph. But legal action against your firm is probably still pending, so what do you do next?

Contact a good photographer—preferably one who has had experience in "legal" photography. Then, at the direction of your attorney, have him make such photos as will refute the plaintiff's claims that your driver was negligent. In the great majority of cases where the driver and equipment is blameless, the camera's eye will ferret out some scrap of evidence that will help support your claims in court. It is also important that the photographer reach the scene as quickly as possible after the accident. In so doing, he will be able to photograph the scene approximately as it was at the time of the mishap.

Photograph Facts

IMMEDIATE surroundings play an important role in most accident pictures. Let's see what can be developed in our case. Witnesses said the child darted into the truck's path. It naturally follows, then, that a photo should be made of whatever the child darted from behind.

In this case, investigating officers report it to be a parked car. Luck is still with us, and our photographer makes a view of the street from the direction in which our truck was approaching, showing the parked car and the manner in which it obscured our driver's view of the child.

Skid Marks Are Evidence

NEXT, a shot is made of the skid marks made by the truck when stopping. The photo shows the marks in relation to the position of the parked car, indicating that our truck was able to stop and did stop within a few feet after striking the boy, and that the driver had begun applying the brakes before striking the unwary young pedestrian.

Still more important, the length of the skid marks will indicate the approximate speed at which the vehicle was traveling at the time of the accident. In this case, it is found that the skid marks, although heavy, extend for only a few feet. The degree of the tire burns is reassuring evidence that the truck's brakes were functioning properly.

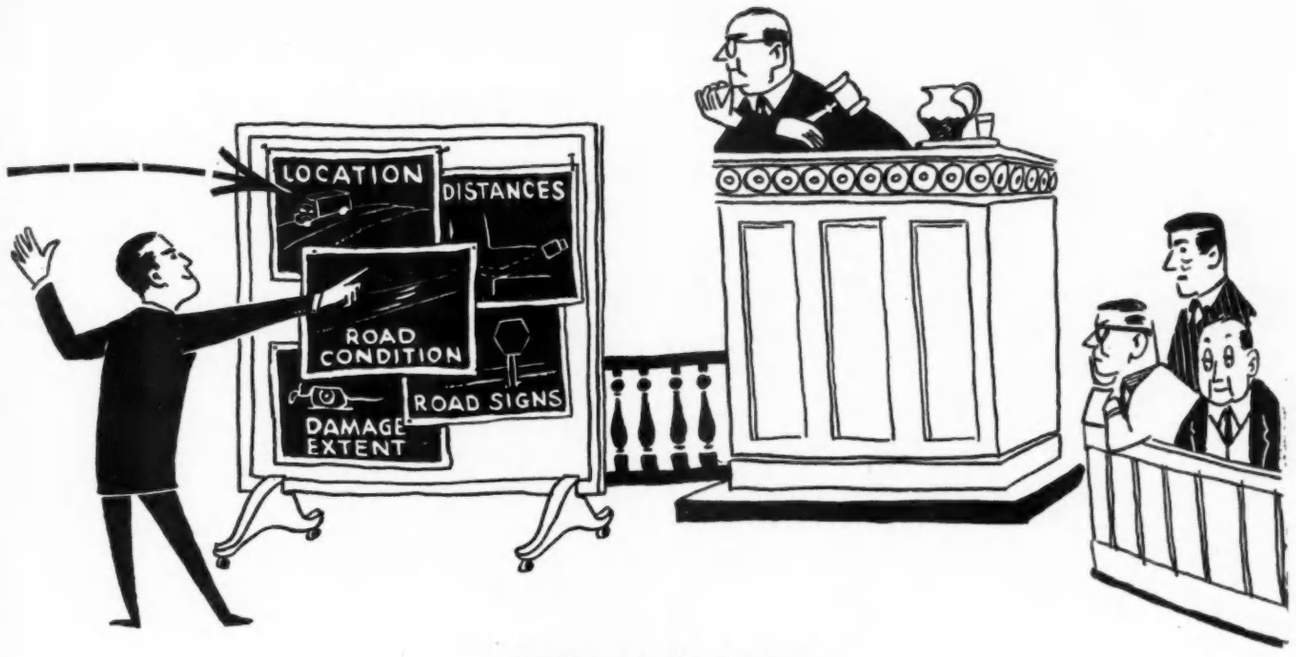
Properly made, these photos will be convincing, but we need a clincher. As is often the case, we find it quite a distance from the scene of the accident—in the form of a large yellow and black stop sign. The sign requires that all traffic proceeding in the direction which our driver was taking must stop at an intersection located a few yards from where the accident occurred.

In other words, our driver, unless he was so foolish as to ignore the stop sign, could not have accelerated his heavy rig to a speed exceeding 15 mph in the short distance between the stop sign and the point where the child was struck. Had he run the stop sign, it is very likely that he would have been struck by an approaching vehicle on the intersecting street because of the heavy current of traffic using it at that particular hour.

Use Props If Necessary

THE photo of the stop sign should indicate as accurately as possible the distance between the sign and the point of the accident. To fix this location as clearly as possible in the minds of the jury, a suitable marker of some kind should be placed at the exact spot where the child was hit, our attorney suggests.

Now our lawyer is well-equipped for a court battle. The photos we have



By Stuart Covington

obtained, backed by the testimony of police and various other persons, will afford us a solid framework on which to base our defense—a framework that the plaintiff's attorneys will have a tough time shaking. The camera's eye might well win our case for us.

Out of the Mud with a Picture

SOMETIMES photography can help a trucker when the tables are turned. Recently a Columbus, Miss., wholesale grocer's truck slipped onto the soft shoulder of a newly constructed highway, sank into the mucky earth of the shoulder, causing the driver to lose control of his vehicle and plunge the truck into a nearby stream, damaging it heavily. The wholesaler demanded damages from the company engaged in building the road, contending that no warning signs had been placed on the approach to the soft shoulders.

The road building firm was caught dead to rights on this count, but claimed that the shoulder where the truck got into trouble was not unduly soft, and that the truck driver was simply guilty of reckless driving. With what must have been a faint chuckle, the wholesaler's attorney produced several enlarged photos showing deep ruts made by the plaintiff's truck's tires in the "firm" shoulder. The construction company quickly settled the claim in full out of court.

Many fleet safety engineers have probably made frequent use of photography in connection with their duties, either wielding a camera themselves or employing a professional photographer to snap the photos they require.

Photography for Safety

IN this category, the camera can be used to teach right and wrong driving methods, show the results of negligent driving, point up various types of traffic hazards, explain proper parking and loading procedures and a host of other related themes. "Blow-ups" of these photos can be used for safety sessions, postcards prepared for distribution to individual drivers or slides made for presentation to larger audiences.

Photos of traffic accidents involving company vehicles always make prime targets for safety discussions.

As a means of records, photographs are unexcelled. A clear 5x7 or 8x10 print shows at a glance the make, model, size and appearance of each truck in the fleet, plus its number and other identification. Taken from a proper position, a photo will also reveal what type of auxiliary equipment the truck has, such as outside air horns, fog and spotlights, steel front end grill, heavy-duty bumpers.

These photographic references can often come in very handy. Let's say, for example, that Truck No. 7 meets with a disastrous wreck many miles from headquarters and is almost completely demolished.

Picturing the Loss

A QUICK look at the photo file will fill in both the mechanical and executive department as to its age, size, special equipment, etc., and a clearer picture of the loss can be quickly obtained. The company's attorney may wish to refer to the photo for legal purposes, and the insurance adjuster might also be interested in examining a picture of the unit.

Written records of equipment sometimes omit important facts. A photo never does that, if the equipment is on the truck's exterior. In the event that written records on a piece of equipment are lost or destroyed, a photograph becomes a reasonably good substitute.

In this compact shop 160 vehicles are maintained. It is small but efficient, and completely equipped. Rebuilding routine is systematized in such a way that a smooth work flow is possible, truly an assembly line operation

Small Shop Produces Big Volume

By Greg Hollenback
Supt. of Maintenance
Wells Cargo, Inc., Reno, Nevada

WE HAVE a 12 by 25-ft tool repair room through which go the parts needing repair on each of our more than 60 Cummins-powered diesel trucks and some 100 units of other miscellaneous equipment.

In this space we have all the necessary tools for handling air equipment repair and rebuilding, as well as complete equipment for overhauling and testing starters, generators, regulators, and also for repairing such miscellaneous electric equipment as stop lights, light switches, electric wipers, etc.

Directly in front of the entrance to this small shop area we have what we call our receiving table or stand. Units for rebuilding and repair are delivered at this receiving bench. As the unit is tested and repaired it goes on through the room and is passed to the parts department through a small window in the rear.

As soon as the journeyman has tested a unit he makes a list of the repair parts needed to recondition it. This list is passed through the window to the parts room. While the parts are being assembled the journeyman works on another unit. In this way there is no delay waiting for repair parts, and we do not throw a heavy load on the parts department.

Here we store our company owned tools which are used by the mechanics working on trucks in an adjoining shop. We keep such tools here as: impact wrenches, portable grinders, air and electric drills, and many miscellaneous heavy-duty tools.

Each tool is outlined in white paint on a tool board. We have our own tool check system. We give each mechanic 6 tool checks with his number stamped on the checks. A master card is posted in the tool room. One glance at this card and the tool board will tell the whole story. We have found this system prevents line loss time and exactly focuses the attention for any delay or loss where it belongs.

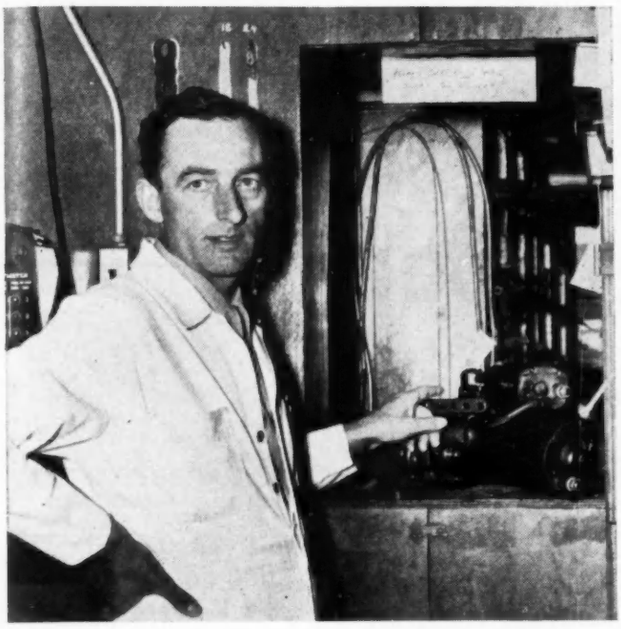
We require that all tools borrowed from the tool room be returned at the end of each shift. The journeyman in charge of the room (same man who handles all repair and rebuilding of units) checks the tools at the end of each shift and hands in to the maintenance office a list of any that are missing.

Greg

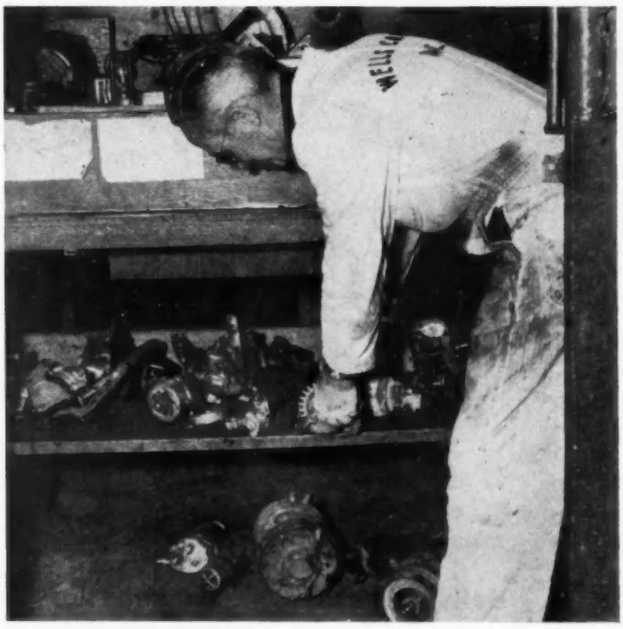
Larry

Air

COMM

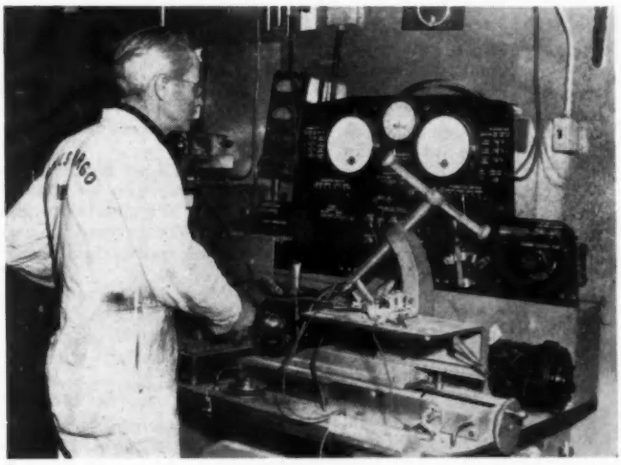


Greg Hollenback, maintenance superintendent, hands reconditioned starter through tool room window



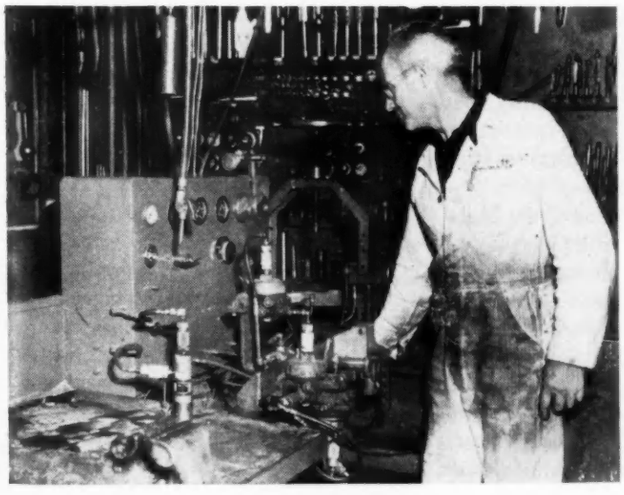
Journeyman Emmett Gantert selects a unit to be tested and repaired from the receiving bench

Larry Strong, parts room clerk, checks reconditioned starter stock. Data is kept on tags

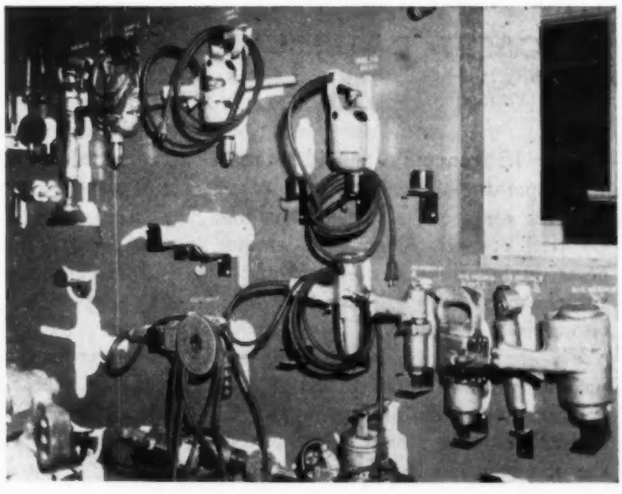


Starters are given a complete bench test prior to placement in stock. Other units get full tests

Air equipment test bench for checking shutter stat, air brake valves, wipers, air governors



Neat wall board with painted background shows where tools are stored, makes quick check of equipment possible



Light Delivery Bodies

It's an important question when fleetmen must choose between aluminum or steel delivery bodies. Here's what experts say:

In the never-ending effort to reduce transportation costs, fleet operators in the light-weight, multi-stop delivery field face two important questions. For maximum over-all economy: 1. Should they use steel or aluminum bodies? 2. Should they use standard panel models or man-high, large volume bodies on forward-control chasses? The following material covers only the first question. The second will be discussed in a later issue.

In debating the merits of steel vs aluminum for delivery vehicle bodies no positive answer can be reached on these pages. But there are definite arguments in favor of both types. Our job has been, with the cooperation of many different sources, to present these arguments in logical, and wherever possible, documented form.

While every attempt has been made to confine each line of reasoning to statements which can be supported by facts, some, of necessity, are diametrically opposed. Where this situation occurs, the conflicting claims have been clearly stated.

We urge that each interested reader consider the arguments for both sides, then form his own conclusions taking into consideration the peculiarities of his own operation.

THE CASE FOR ALUMINUM

IT IS economic suicide for a fleet operator to base his choice of vehicles on their initial cost alone. Over-all operating and maintenance costs during the expected life of the vehicle must be considered if a wise choice is to be made.

This principle has long been supported by vehicle manufacturers, has become accepted by fleet operators generally. You might assume that the principle would apply also to the selection of bodies. Logically, it should. In practice, however, many retail delivery fleets shy away from using aluminum bodies, present as their major reason the claim that the initial cost is too high.

Against the argument of the higher initial cost, aluminum body manufacturers can present an impressive array of potential cost savings through proper use of their lighter-weight products in the retail delivery field. Among them: longer chassis life, greater gas mileage, longer tire life, longer parts life, potentially lower license fees, lower painting costs, higher scrap value and lower repair costs for denting and corrosion.

Initial Cost Only 5%

IF the average life of a route truck is assumed to be 14 years, then the initial cost is actually only from three to five per cent of the unit's over-all cost for its lifetime, with the greater portion of the total costs being made up of maintenance and overhead costs and the driver's salary. Therefore, a difference of 50 per cent in the initial price of the vehicle would mean at most a difference of three per cent in its over-all cost.

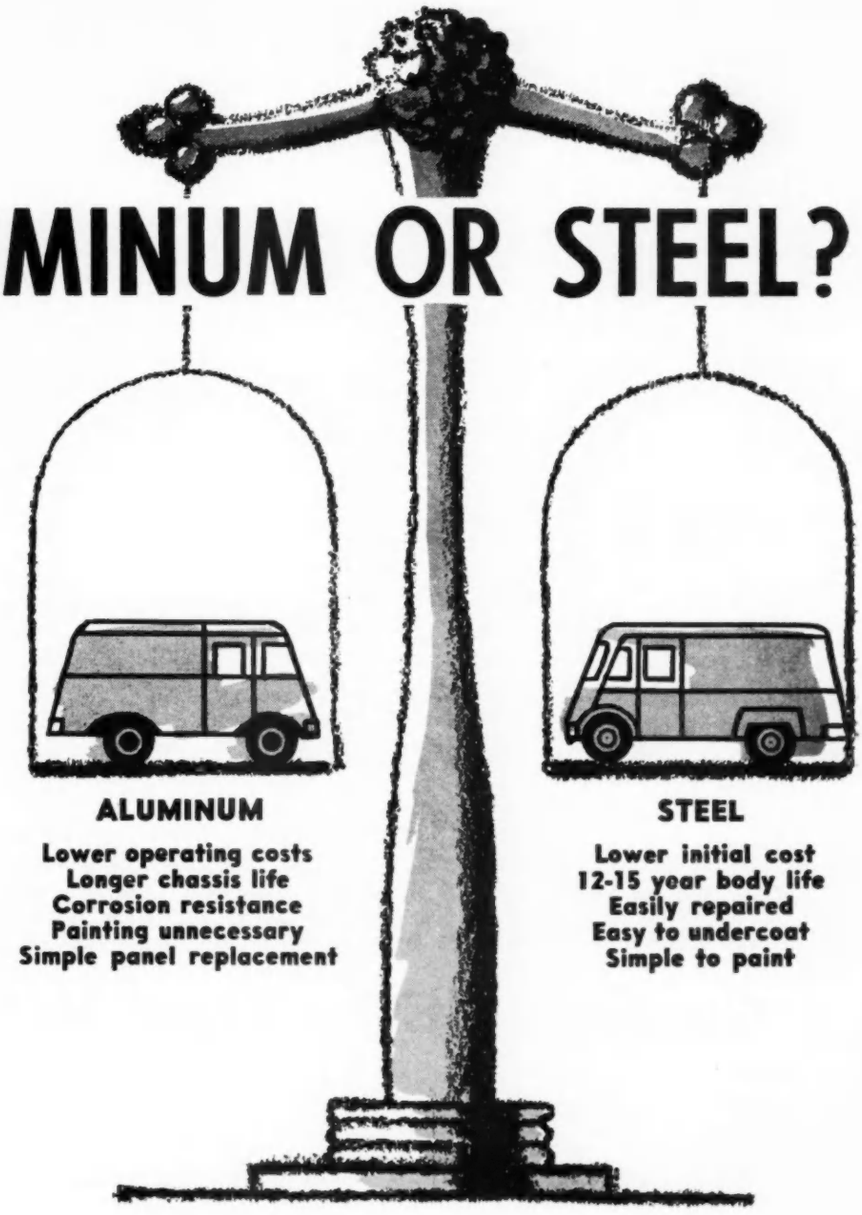
To illustrate this point, let's say that a fleet purchases a route truck complete with body and standard equipment for $3000. During its assumed 14-year lifetime it is expected to average 10,000 miles per year or a total of 140,000 miles. Operating cost, including gas, oil, maintenance and overhead (excluding driver's salary) is estimated to average 10 cents per mile or a total of $14,000. Driver's base salary for the 14-year period, assuming an hourly rate of $1.75 with a 44-hour week, 52-week year is $53,256. Therefore, the over-all cost of the vehicle is $70,256 and the initial cost is only 5 per cent (approximately) of the over-all cost. In some fleets, drivers' commissions are also considered part of operating costs. Where this policy exists, the relationship of initial cost to overall cost is proportionately lower.

For the purpose of this discussion it is assumed that maintenance, operating and overhead expenses are cut to the bone; that cost per mile is low, that driver-salesmen's wage scale can't be cut.

If you insist on staying with steel

(TURN TO PAGE 136, PLEASE)

ALUMINUM OR STEEL?



THE CASE FOR STEEL

MANY debate on the merits of various types of metals for multi-stop delivery bodies should establish one major joint from the very beginning. The choice of materials to be used in such units is available to all truck manufacturers and body builders; therefore with a choice of materials and design to sustain its reputation no firm would purposely risk an unfavorable reaction to its product by ignoring any suitable available materials or favorable design.

To place undue stress on the choice of any particular material for this type of vehicle, without proper qualification, leads to wrong conclusions and acts as a boomerang, and many a good transportation man has gone off the beam in selecting his delivery units because he has taken for granted as true the exaggerated claims of a particular manufacturer without investigation or proof.

Confining our discussion only to those units specified in the introductory note, let's take a quick look at the qualities of the two metals as they apply to this field. Differences in these qualities are of course based on the metals' inherent properties and attributes.

Weight: Present aluminum bodies in this class range from 500 to 1000 lbs lighter than steel bodies with the same capacity.

Utility: For purposes of general examination, equal.

Initial Cost: There is a difference of from $450 to $500 in favor of steel bodies.

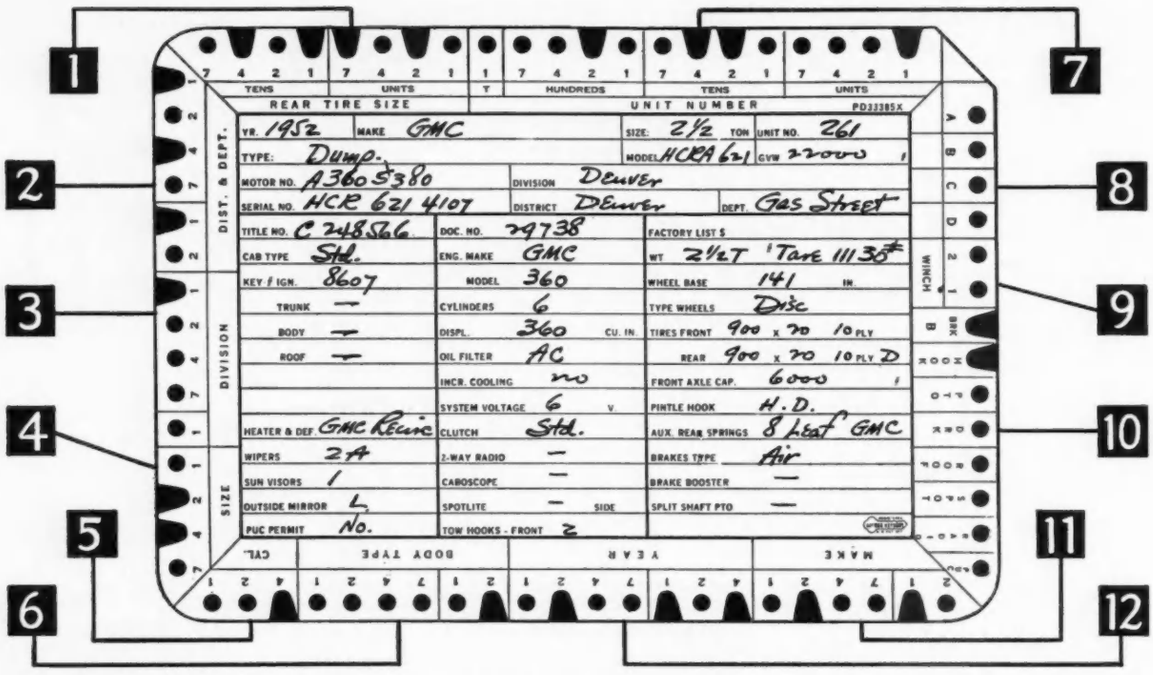
Maintenance: Steel bodies are less costly, and considerably so in some cases, to maintain. Painting of steel bodies requires less in materials and time, costs less.

Durability: Steel man-high bodies, properly maintained, have proved themselves over a period of 12 to 15 years. The company which pioneered the development and manufacture of multi-stop trucks with steel man-high bodies commenced their sale in 1938. Many of its early units still are in service. There is no such broad experience with aluminum man-high bodies, whose origin of manufacture is comparatively recent.

Appearance: When properly maintained and painted, equal.

As may be seen in the initial summary above, the type of aluminum body being discussed is lighter; the type of steel body is less costly to purchase and to maintain. These are the only measurables which may be compared in a general discussion.

(TURN TO PAGE 148, PLEASE)



Public Service Co. of Colorado vehicles are catalogued on punch cards under the following headings:

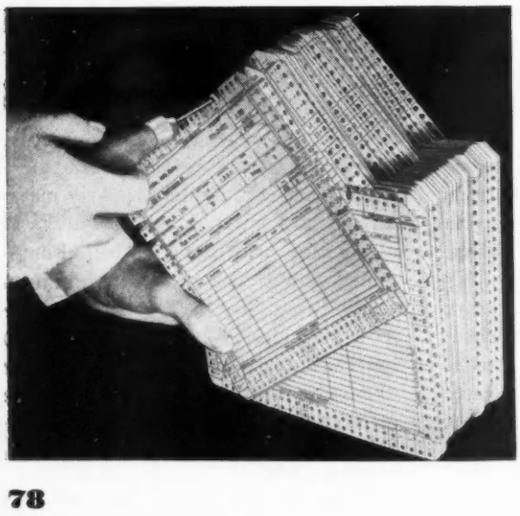
1—Tire Size
2—Dist. & Dept.
3—Division
4—Size
5—Cylinders
6—Body Type
7—Unit Number
8—Spare Holes
9—Winch
10—Misc. Equipment
11—Make
12—Year

Simple Record System

Controls Utility Fleet Vehicles

By E. J. Graham
Superintendent of Transportation
Public Service Co. of Colorado

Sorting cards from the file is a simple procedure. A clerk inserts a sorting needle through any desired groove and lifts up. All cards punched at that point are unsupported and drop from the file



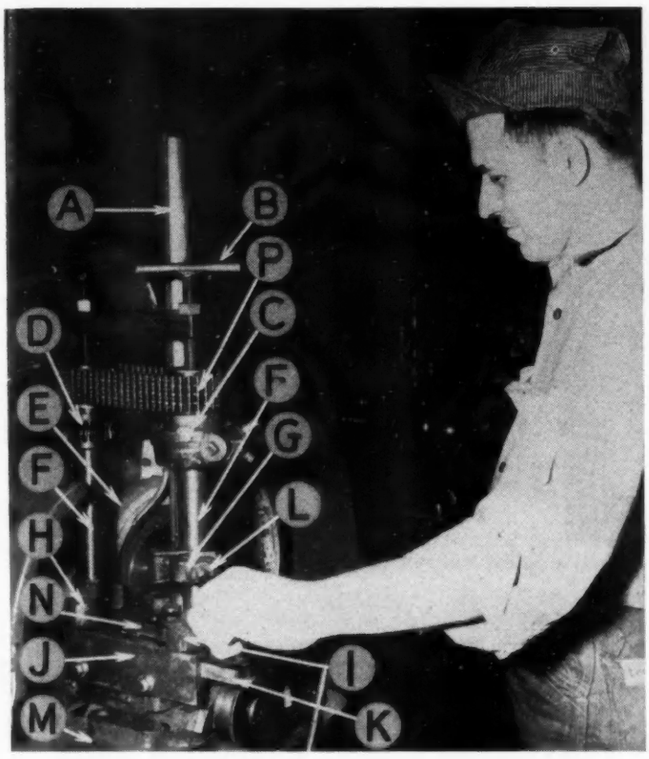
A SMALL but detailed punch cards provide us with an efficient, inexpensive equipment control record system at our head office of the Public Service Co. of Colorado in Denver.

Using coded punch cards and a simple sorting system we have a useful catalog of all our vehicles and the accessories with which they are equipped. With this system we have a written listing of the specifications of each unit and its equipment. Punched coding permits us to sort quickly the cards to obtain a listing of the vehicles in various categories. For example: we may sort the cards according to vehicle make or weight, rear tire size, vehicle number, division or district and department, body type, number of cylinders in the engine, or into groups of vehicles with similar accessories. When we want to list the vehicles equipped with say two-way radios, a simple sorting operation will select all the necessary cards from the file.

We use the Keysort System, developed by the McBee Co., Denver. With it we have a compact record file and a convenient catalog of data ready for instant and varied use by management.

Each vehicle has its own card which is generally filed in numerical order according to the vehicle number, since most

(TURN TO PAGE 100, PLEASE)



Here's how Niagara Frontier Transit System saves money by salvaging brake cams. You too can build this jig at little cost. Nomenclature is explained in story

SHOP-BUILT MACHINE Salvages Brake Cams

TIME and money is saved, and a rebuilt brake cam as good as new results by using an ingenious shop-designed brake cam jig at Niagara Frontier Transit System, Inc., Buffalo, N. Y. Brake cams are ground down to the proper specifications on this machine by following the exact contours of a new or a master cam.

Here is the way it works: The two upright posts are adjustable centers fitting down into, and controlling the motion of the new and rebuilt brake cam shafts. The left-hand post is fitted with a splined slack adjuster (D) to which is welded a sprocket.

The right-hand post is equipped with a bus slack adjuster which fits over the splined end of a new brake cam shaft. A sprocket is welded to its inside. A timing chain runs from sprocket to sprocket connecting the two posts as the jig operates and imparts the same motion to each.

Before going into operation (D) is removed and the rebuilt cam to be processed is placed on the stationary center at the bottom of the post. (D) assembly is then replaced. At this time the master cam (I) is placed in position upon its stationary center at the bottom of the post. Both centers are then firmly screwed down to hold the cams in solid position during the grinding operation.

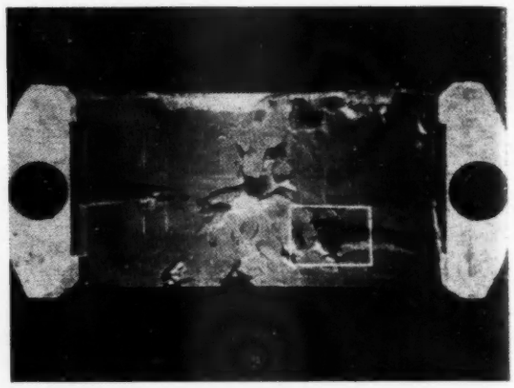
A vertical bar (A) has an adjustable center bracket which has a key running the full length of the bar. This bar holds the top centers in correct position in relation to the bottom centers. Thus top and bottom centers are virtually one unit as the jig operates. This bar also serves to adjust for heighth when different length brake cams are to be ground. The face of the rebuilt cam (H) to be ground rests against an abrasive grinding wheel (E) which grinds as the two posts rotate.

The rebuilt cam follows the contours of the master cam by reason of the fact that the bottom centers, upon which the rebuilt and master cams rest, are fastened to a male slide (K). The vertical post (A), controlling the upper centers, is also fastened to this slide so that in operation bottom and top centers functions as a unit.

The male slide (K) is carried in a female slide (J) which is bolted to the traverse table of the valve grinder. Slide (J) has a lug which protrudes through a slot in male slide (K) and contacts the contour of the master cam under constant tension imparted by a heavy spring. This spring is located in such a position as to place a constant spring load between the lug and slide (K), thereby controlling the length of travel of slide (J) according to the contours of the master cam.

This, in turn, dictates the travel of the rebuilt cam over the surface of the grinding wheel so that the rebuilt cam is ground to the exact specifications of the master cam.

The operator of the jig rotates the jig to follow the contours of the master cam by means of a lever (L). The amount of material removed from the rebuilt cam is controlled by the micrometer adjusted tables found on the grinder.



Left. Hard carbon particles imbedded in the babbitt lining (enlarged view) cause early failure. Above. Bearing surface failure resulting from poor bond and metal fatigue

Photos 2, 3 and 4, courtesy "Lubrication" published by The Texas Co.

Analyze and then *Correct* BEARING FAILURES

By H. W. Luetkemeyer, Engineering Department, Cleveland Graphite Bronze Co.

A study of engine bearing failures is the first step in correcting them. Here are facts

Typical Bearing Failures
- **Fatigue**
- **Seizure and wiping**
- **Corrosion**
- **Erosion**
- **Wear, abrasion and scoring**

Fatigue is caused by:
- **Bent rods**
- **Crankcase misalignment**
- **Cap shift**
- **"Hour glass" grind on shaft**
- **Worn shaft**
- **Foreign particles under back**
- **Foreign particles in surface**
- **Fluted grind chatter on bore**
- **Uneven finish on bearing bore**
- **Poor bond**
- **High temperatures**

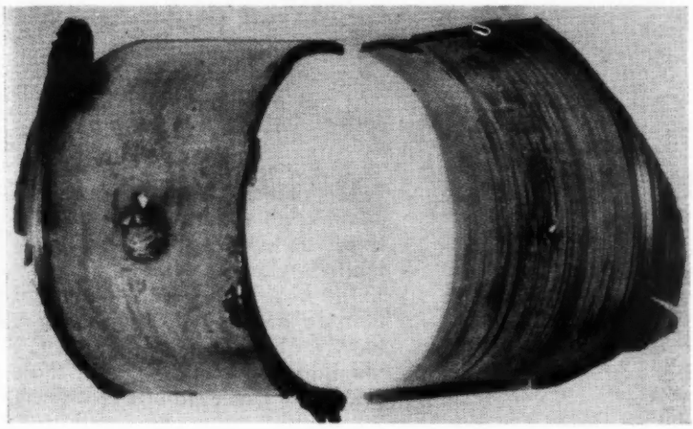
Wiping and seizure is caused by
- **Foreign material in lubricant**
- **Misalignment of shaft**
- **Roughness of shaft**
- **Low clearance**
- **Failure of oil supply**

With continued failures, check
- **Engine cleanliness**
- **Main bearing bore, rod bore and shaft misalignment**
- **Engine lubrication study**
- **Clearances**
- **Shaft surface finish**

IN A BROAD sense, bearing failures can be identified as one of or a combination of the following: 1. Fatigue, 2. Seizure and wiping, 3. Corrosion, 4. Erosion, 5. Wear, abrasion and scoring.

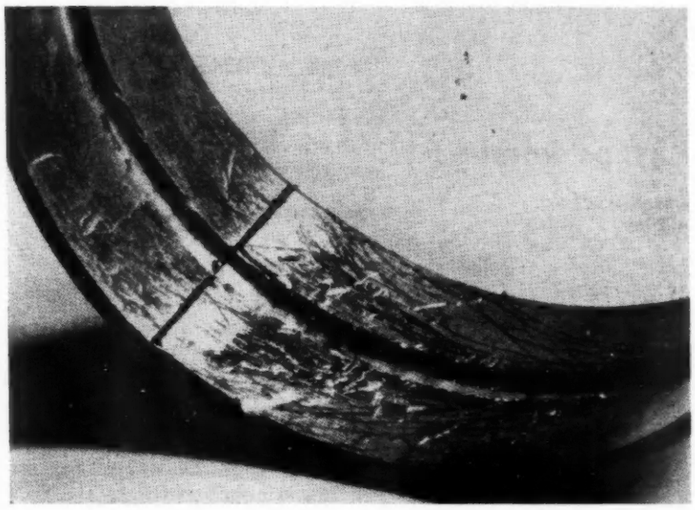
A person acquainted with bearing failures can usually and rather accurately place a failed bearing in one or more of these categories merely by visual examination. The reason for the failure, however, is not always so obvious. It is often necessary to submit the bearings to a laboratory for a metallurgical, chemical, and dimensional analysis. If further

—Excerpted from a paper presented at the American Petroleum Institute Meeting in Detroit



Completely wiped bearing. Surface wiping and seizure result from off-conditions that bring about localized breakdown of oil film

Bearings surface failure resulting from foreign particles in the lubricating oil. Major cause of surface failures is dirt



every fleetman should know

diagnosis is necessary, much can be learned from an investigation of the apparatus from which the bearing was taken. Unfortunately, there are times when the cause of a bearing failure remains a mystery, simply because certain operating details are lacking or the unit from which the bearing was taken cannot be reached or identified.

Fatigue

IN the past, fatigue has been the most common type of bearing failure in applications with cyclical loading. It consists of cracking, raising, pounding out, or flaking out of the lining and is most apt to be found in the white metal alloys. Important factors that determine fatigue life are the strength of the alloy, the unit load, and the operating temperature.

Quite frequently, engine power ratings are increased without fundamental design changes in the bearing. The result is premature and unexpected failure due to loading the bearings beyond the point for which they were originally designed. Babbitts, although highly desirable from an embedability and anti-seizure point of view, represent the weakest family of metals in fatigue strength. However, their life is appreciably lengthened when their thickness as a lining is reduced below 0.010 in. Here the fatigue strength of lead and tin base babbit begins to improve at an ever-increasing rate so that at 0.002 in. an approximate 400 per cent increase in life is realized. A lining thickness less than 0.002 in. on a steel back is not practical because of poor dirt embedability. Therefore, if micro babbitt (0.002/0.005 in. lining) continues to fatigue in a given application, a higher strength alloy is required.

Fatigue failure sometimes results from a poor bond between the lining material and steel. Failure from this cause is characterized by a clean break of the alloy away from the steel. Whether or not this separation exists can usually be determined by a metallographic analysis of the bearing cross-section.

Since the selection of a bearing alloy is based primarily on the anticipated load, it is of prime importance that the load be calculated as accurately as possible. Unit bearing load calculations are based on the assumption that the total load will be uniformly distributed over the projected bearing area. Actually, however, this is not always the case. If misalignment exists between the shaft and bearing bore or if the bearing surface contains high spots, excessive localized loads will result. It is usually possible to recognize and determine the cause of such load concentration and fatigue. Off conditions that set up fatigue failures in characteristic locations are:

1. Rod bend, such that the bore of the large end is not parallel with the bore of the small end.
2. Crankcase misalignment.
3. Shaft misalignment.
4. Cap shift.
5. "Hour glass" or "barrel" grind on the shaft.
6. A cammed condition worn on the shaft by a bearing with a partial annular groove.
7. A foreign particle between the back of the bearing and the housing.
8. Embedment of a large foreign particle in the running surface.
9. Fluted grind chatter on the housing bore.
10. A rippled, uneven finish on the bearing bore.

Along with load, operating tem-

(TURN TO PAGE 120, PLEASE)

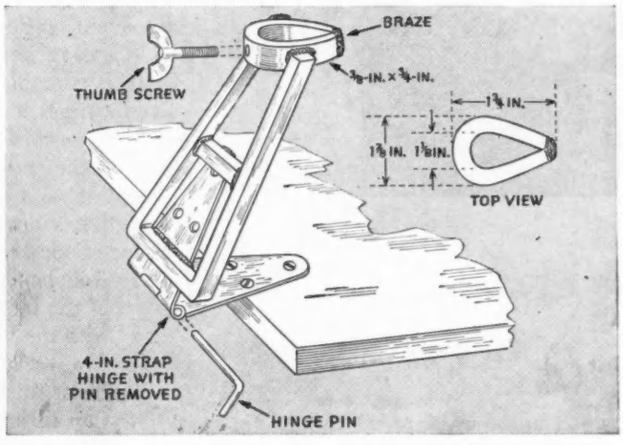
Shop Hints

Here are some swell time savers for fleet shops. Let us have your ideas for new tools or short cuts to service. We'll pay $10 and $25 for good ones.

$25

Distributor Stand Stops Damage

By John Shramko
New York, N. Y.



This hand stand for overhauling distributors is simple to make and does away with the possibility of marring the distributor base in vise jaws. When not in use, it drops below the workbench.

For the frame, take ⅜ in. square stock about 17 in. long and bend it into a U shape, tapering from 2½ in. inside width at the bottom to 1⅞ in. inside width at the top. A 4-in. strap hinge is welded to this as shown. The hinge pin is removed and a piece of bent welding wire or similar rod is substituted. The other half of the hinge is mounted on the workbench so that when the stand is in use it makes an angle of about 60 deg with the bench surface.

The clamp at the top is made from ⅜ in. by ¾ in. flat bar stock. It is shaped into a teardrop as above and the ends brazed solid. A hole is drilled in the back and threaded for the thumb screw. The clamp is then brazed to the frame. To use, simply drop the clamp over the top of the distributor, being sure the bottom of the distributor is flat on the workbench, and tighten.

Clutch Jig Eliminates

By J. Fischer
East End Dairies, Indianapolis, Ind.

This clutch adjusting jig makes possible an accurate setting of the levers on several models. We built the fixture at a cost of $1.50.

The base plate is drilled to take bolts to hold the pressure plate assembly. To this is welded a ½-in. rod threaded at the top as shown. The compression plate is of sufficient

Tool Makes Ford V-8

By Rolla E. Brown
Bellows Falls, Vt.

Here is a handy tool for adjusting slack adjusters on the Ford F-8. I made the tool from a ⅜-in. Allen wrench, cutting off a section three inches long and swelling a head on

Door Knob Gives Extra

By Arthur R. Tanner
Cold Spring, N. Y.

A good solid grip that provides additional leverage for hacksaw work can be had by fastening an ordinary metal doorknob on the top of the saw frame near the front. The shaft

Spanner Wrench Aligns

By Charles Stauber
Sheboygan, Wis.

There are many times when installing an engine where the transmission has been left in the chassis that there is trouble getting the clutch shaft spline started into the clutch plate.

Socket Fits Most Timken

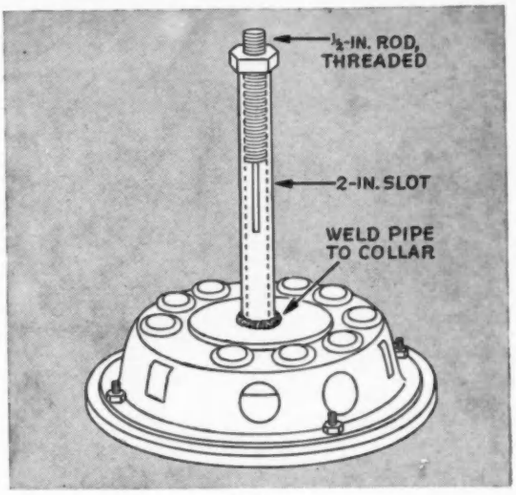
By Walter G. Ferland
Falls Church, Va.

For making major brake adjustments on many trucks with Timken drive axles, here is a socket that will fit most brake anchor bolts. Take a piece of ⅜-in. thick steel plate 1½ by 1½ in. and cut out a groove in the

Trial and Error Method

$10

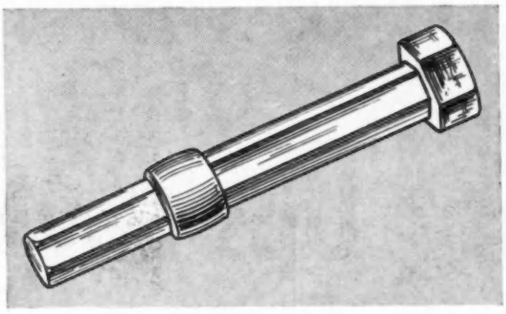
size to contact all levers. To this is welded a collar or sleeve which fits over the rod and is compressed by turning down the top nut to the required tension. A 2-in. slot in the sleeve with specification for each clutch model cut on the rod, enables the mechanic to secure a quick and accurate adjustment of the levers.



Slack Adjustment Easy

$10

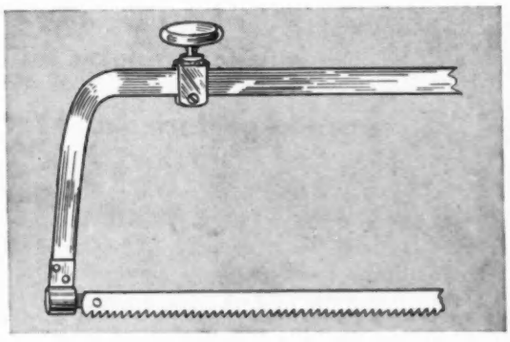
one end for a ⅝-in. socket. A stop is provided on the other end to hold the socket. Thus I have an extension that enables me to get at the adjustment without interference.



Leverage on Hacksaw

$10

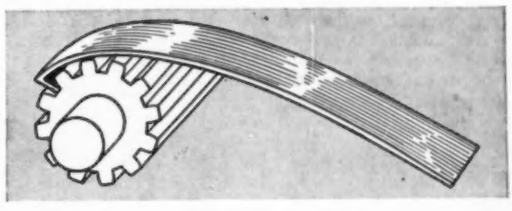
on the knob can be cut off and the handle welded to a clamp with locking arrangement as shown, or the knob shaft itself can be slotted, fitted over the frame and brazed.



Clutch and Shaft Spline

$10

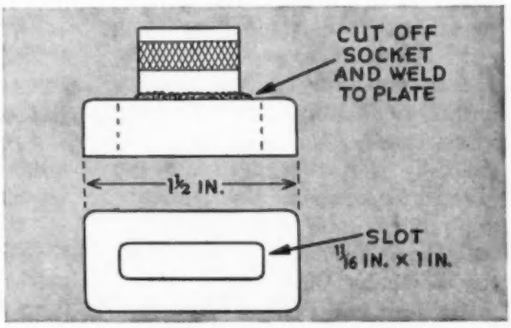
If you put the transmission in neutral, a shop made spanner wrench, as illustrated, can be used to turn the shaft and line-up the spline, saving time and preventing skinned knuckles.

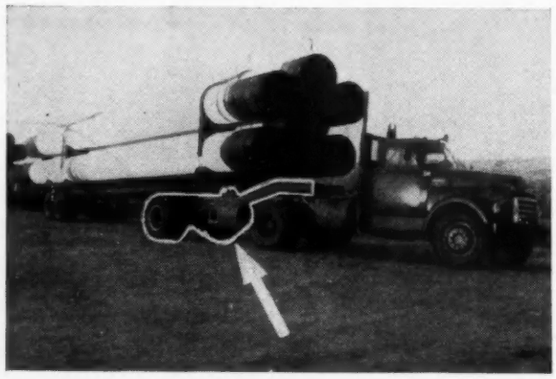


Brake Anchor Bolts

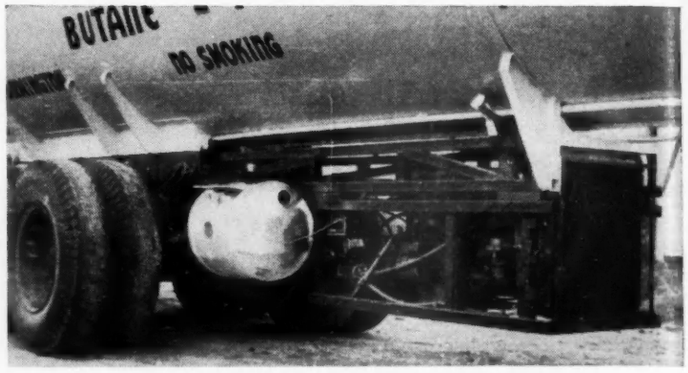
$10

center 11/16 in. wide by 1 in. long. Then take an old ½-in. drive socket and cut off the socket. Weld the socket base to the steel plate and you have a wrench for most brake anchor bolt adjustments.





The power package with engine, tandem axles and fifth wheel is set between tractor and trailer, controlled from cab as required



Another version of the unit is this separate engine powering the trailer axles. Overall road speeds are increased by 30% with Dynassist. Other applications are made on self-loading floats

Power Package "Jeep" Ups Payload by 7000 lb

An auxiliary engine powering front trailer tandem unit improves grade performance, saves fuel, cuts weight, reduces tire scuffing

Brief mention of auxiliary power packages for trailers at the tag end of an article concerning southeastern carriers in March CCJ produced some interesting correspondence from Loyd Wolf of Wolf Engineering Corp., Irving, Texas. Excerpts from his initial letter and from a second in answer to specific questions tells the story of development work in this field . . . The Editors.

WE HAVE been producing these power packages and selling them under the trade name of Dynassist since the latter part of 1950. One important angle which seems to have been overlooked by both your article and Billy Horton at Brown, is the powered jeep version, which we have been producing for West Coast use.

An example is one of a fleet of thirteen 4-cylinder GMC diesels owned by California & Pacific Truck Co., Inc. The total horsepower is 258. The weight of the combination is 15,430 lb, whereas the weight of the GMC conventional tandem with 225 hp would be 17,215 lb. The maximum gross load on the tandem would be 32,000 lb. Because of the 12 ft 8 in. wheelbase of the jeep tandem, the grossload capacity is 37,100 lb, giving a total payload increase of 6,985 lb and completely eliminating the usual tire scuffing brought about by a tandem drive.

The California-Pacific Truck Co. trucks are 630 and 650 GMC diesels, using the 4-71 engines. They have 150 gross hp and 134 net hp. The engine in the jeep is the SD-240 International rated at 108 hp followed by a Fuller single stage torque converter and 2-speed Clark gear box. Eaton 2-speed axles are used, giving us the equivalent of 4-speeds behind the converter. The transmission ratios are 1.64:1 and 1:1. The rear axle ratios are 6.16-8.577:1.

As far as gradient ability is concerned, grade performance is somewhat better than equal horsepower in a single engine because the rear unit is constantly splitting the gear ratios of the front unit. For example, let us say that we have a 4-speed transmission in the tractor with no 2-speed axle or auxiliary box. With this 4-speed transmission there would be four and only four percentages of grades, which the gearing and engine horsepower actually matched. Now, if we added a second engine and only a torque converter or fluid coupling, the second engine would be delivering power to the wheels at an infinitely variable ratio. In other words, there would be a very high range of grades which each gear in the 4-speed box matched. There is

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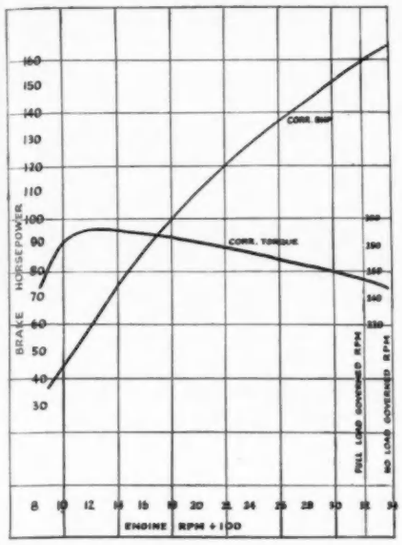
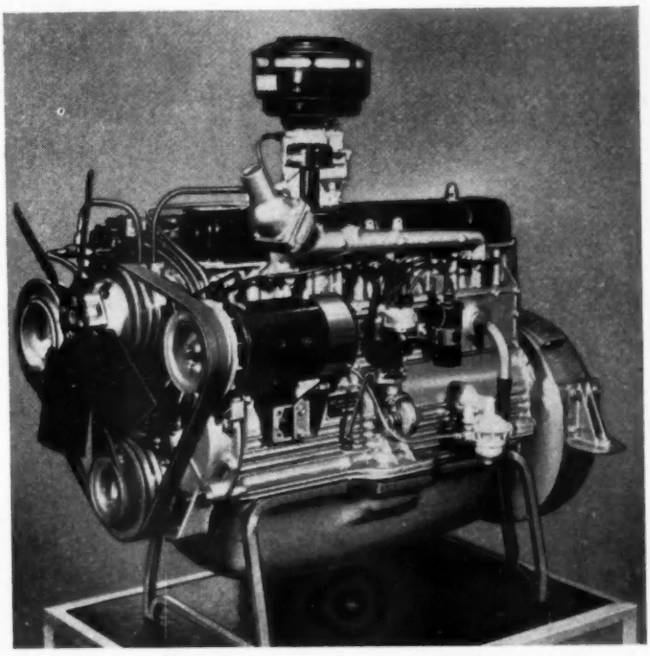


Torque and brake horsepower curves



Left hand view of OH-160 engine, showing new manifold, carburetor, distributor. Engine develops 160 hp at 3200 rpm.

Condensed Specifications

Type	Overhead valve
Bore	4⅛ in.
Stroke	4⅛ in.
Displacement	331 cu in.
No. of cylinders	6
Piston rings—No.	4
compression	2
oil control	2
Compression ratio	6.73 to 1
Gross BHP @ Rated Speed*	160 @ 3200 rpm
Maximum torque (lb ft)*	290 @ 1400 rpm
No. main bearings	7
Lub oil sump capacity (less filter)	8 qt
Cooling system capacity	23 qt

* These values given without fan or muffler.

REO'S New Gold Comet Delivers 160 HP

Higher output OH engine features improved manifolding, twin-barrel carburetor, 6.73 to 1 CR

REO MOTORS has introduced a higher output Gold Comet engine developing 160 bhp at 3200 rpm. This OH-160 has a displacement of 331 cu in., the same as the earlier OA model, yet it develops 20 bhp more. Improvements have been attained by an improvement in manifolding, better fuel distribution and an increase in compression ratio from 6.4 to 6.73 to 1.

Carburetor on the new OH engine has been mounted directly on the top face of the intake manifold, feeding in full down-draft fashion. A new type twin-barrel carburetor supplied by Zenith or Holley is used. The sandwich type speed control governor is used with the Holley carburetor.

The new engine requires a new high-lift camshaft with a different timing, design valve overlap on the OH being 35 deg. Although electrical equipment remains basically the same, the OH has a different distributor with a different curve for automatic advance.

All power producing components have been redesigned to effect greater rigidity and greater load-carrying ability. This prevents interchangeability of major parts between the OA and OH models, despite their outward similarity.

A new and heavier crankshaft is used. Main bearing and crankpin journal diameters have been increased, with a consequent increase in bearing liner sizes. A new cylin-

(TURN TO PAGE 104, PLEASE)

PROPANE CABS Save 12% in Fuel—50% in Oil

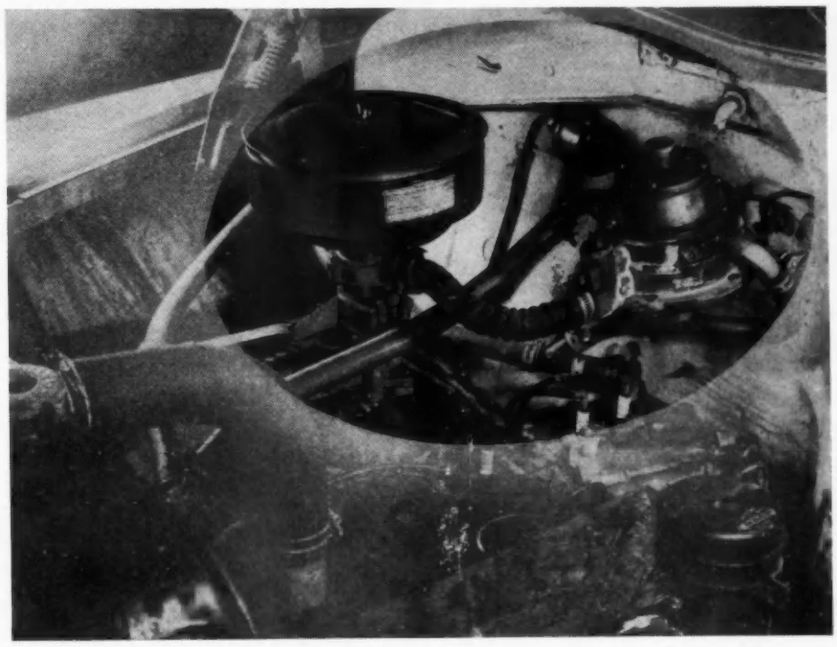
Propane pump and storage tank cost $5500 but Boynton figures savings justify the high cost of installation

A 12 per cent saving in operating costs is enjoyed by Boynton Cab Co. in Milwaukee. This company puts about 6½ million miles a year on 209 Plymouth and Chevrolet cabs. They have 199 cabs on propane and 10 on gasoline. A test, with 10 propane and 10 gasoline cabs, of about 800,000 miles for each group showed a cost of $0.0292 per mile with gasoline compared with $0.0257 for propane. The cost per mile includes fuel, oil, add oil, labor and material maintenance. Gasoline was figured at 22.1 cents per gallon, propane at 17.1 cents per gallon and oil at 12.5 cents per quart.

Dix vaporizing equipment is used on most cabs and pressed steel tanks, weighing 65 lb, are standard equipment. The installation takes about eight hours and the total cost is about $150. In addition to the cab investment, $5,500 was invested in a propane pump and storage tank. Thus the 12 per cent saving and 6½ million miles a year justify the extra investment in propane equipment.

Whenever new methods are tried, there is usually a high cost period due to learning different methods. Boynton starting converting to propane in the fall of 1950 and found it profitable from the start. However, the cost figures given are from a recent test after operating procedures had been established.

Another cost factor is the maintenance and expected life of the extra equipment. Vaporizers have run 75,000 miles without trouble whereas carburetors need cleaning and re-

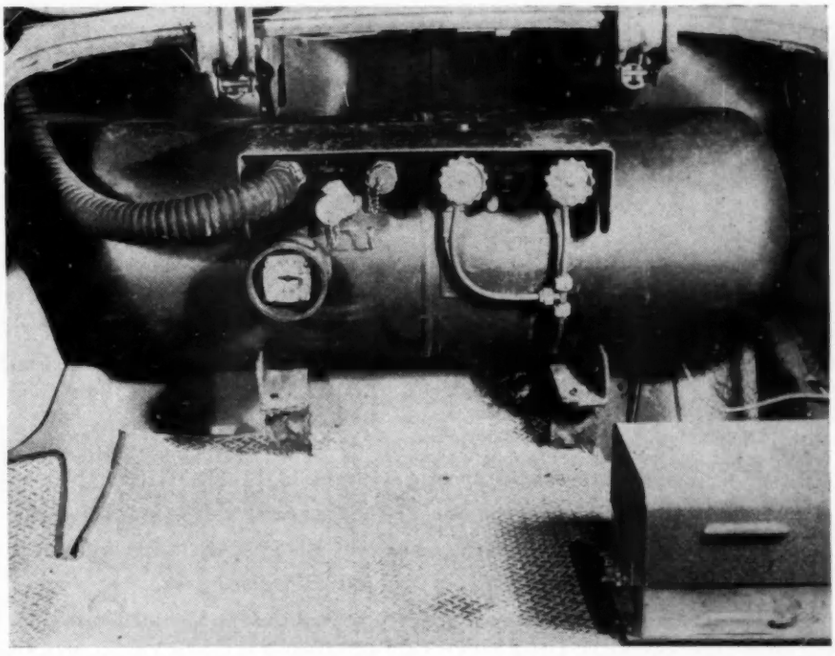


A typical conversion using Dix equipment. Installation takes about eight hours

199 cabs, converted to LP gas at a cost of $150 per unit, operate at $0.0257 per mile, whereas gasoline operated units cost $0.0292

By L. T. Bruhnke

The 65-lb pressed steel tank is mounted in the trunk, where it is easy to service



building after from 20,000 to 30,000 miles. It is planned to shift the vaporizing equipment to new cabs when the old ones are no longer economical. The heavy propane tanks should last a minimum of ten years.

No special training is needed for either drivers or mechanics nor is it necessary to have a lot of extra testing equipment. Spark plugs and distributors are set the same as for gasoline and timing is advanced 3 to 5 deg. In starting, it is necessary to push a solenoid button to raise the diaphragm to start the fuel flowing. This might be compared to a manual choke for gasoline. It is necessary to open the trunk to see the fuel gage, but checking fuel is only done after eight hours of driving. An odor is added to propane so leaks can be smelled.

Boynton cabs are stored outside on a parking lot and some of the propane units are hard to start when the weather gets below zero. A large booster battery solves this problem satisfactorily because Milwaukee does not have many below zero days and not all propane cabs give trouble. With propane, there isn't any crank

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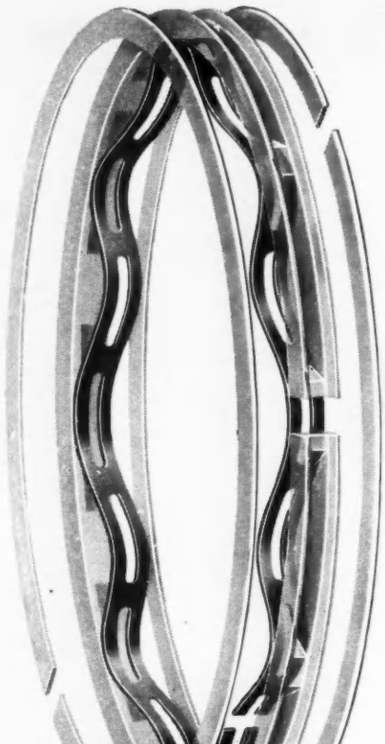

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Sealed Power Piston Rings

BEST IN NEW TRUCKS BEST IN OLD TRUCKS

Free PUBLICATIONS

FOR YOUR CONVENIENCE USE THE POSTCARD ON NEXT PAGE

L1. Safety Booklet

The 19th in a series of this excellent safety booklet takes the accident statistics for 1952 and compares them with the record for 1951. Unlike many statistical presentations, this one is interesting reading. Along with the easily read charts, a brief text interprets the facts in a pointed and easily understood style.

Fleet safety men will find this an excellent safety reminder to give their drivers, and the drivers will probably find it makes good reading.

Some of the subjects covered include; (1) types of highway accidents, (2) what drivers do that cause accidents, (3) what to watch for to avoid pedestrian accidents, (4) what time of day accidents happen, (5) age of drivers involved in accidents, (6) weather and road conditions when accidents occurred, (7) how much experience drivers involved in accidents had, (8) mechanical condition of vehicles in accidents, (9) direction of travel of vehicles in accidents, and (10) what days accidents happen.

The entire book is presented as an individual problem, placing the responsibility for reducing accidents on the driver.

Included is a chart comparing 1952 and 1951 commercial vehicle and bus accidents, showing commercial vehicles were involved in 21.5 per cent of fatal accidents and 11.7 per cent of non-fatal accidents in 1952 as compared to 21.8 per cent of fatal accidents and 12.2 per cent of non-fatal accidents in 1951. The bus record for 1952 is reported at 1.3 per cent of fatal accidents and 1.9 per cent of non-fatal accidents for 1952 against 1.5 per cent of fatal accidents and 2.0 per cent of non-fatal accidents for 1951.

To get a copy of this book, circle L 1 on the postcard on the next page.

L2. Engine Bearing Data

In earlier days, some mechanics are reported to have made temporary engine bearing repairs by inserting pieces of leather belting. This report, while mentioning this fact, gives in fourteen, well-written pages a summary of what is needed in today's bearings, surveys bearing materials and gives a round-up of bearing failure causes.

Among the many illustrations included in the publication are several magnified, cross section photographs of the different types of bearing surfaces as well as photographs of what happens in bearing wear.

In addition to discussion of bearing design, manufacture and lubrication, several pages are devoted to recognition of the causes of bearing failure as a basis preventative maintenance.

For your copy of this complete engine bearing report, circle L 2 on the postcard.

L3. Ball Bearing Data

Another phase of bearing maintenance, ball and roller bearing failures and their causes are covered in this 16-page booklet. The text is carefully illustrated with 45 illustrations of different types of ball and roller bearing wear, aiding the maintenance man in recognizing the fault.

This guide lists and discusses nine major bearing failure causes as follows; (1) malformation of bearing seatings on shafts or in housings, (2) misalignments, (3) faulty fittings, (4) wrong fits, (5) inadequate or unsuitable lubrication, (6) defective sealing, (7) vibration while bearing is not rotating, (8) passage of electric current through the bearing, and (9) defects of material and errors of manufacture.

Circle L 3 on the postcard for your copy.

L4. Road Program Guide

That our streets and roads are inadequate for today's traffic volume is an all too well known fact. Here is a brief three-page summary that gives the highlights of three steps necessary in transforming the need into action. Fleetman will find information here on how highway departments should approach this question. The importance of year-to-year street and highway inventories, easy-to-read reports on highway progress and first-things-first annual programs are the three steps suggested in the folder to give action to a state's highway program. To keep yourself up-to-date on highway matters, circle L 4 on the postcard.

L5. Safety Catalog

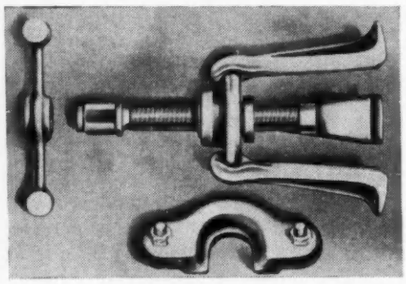
Many a fleet safety and training program bogs down because of a lack of daily reminders of the material discussed in meetings. While fleet safety men know that posters are one means of preventing this, there is sometimes a problem of where to get them at reasonable cost. This 72-page directory of safety posters will be of help in locating the poster needed. A special section of the catalog gives a check list on how to choose and use posters effectively. Circle L 5 on the postcard to obtain a copy.

L6. Pallet Truck Guide

Point by point, this comparison chart lists 19 factors for consideration in the purchase of hand propelled, hydraulic operated, pallet trucks. It is designed to eliminate guesswork in deciding on what equipment to buy. It outlines the questions to be asked and provides three columns for comparing different manufacturer's models. Circle L 6 on the postcard for a copy.

NEW Products

ADDITIONAL DETAILS AVAILABLE UPON REQUEST VIA POSTCARD



P1. Wheel Puller

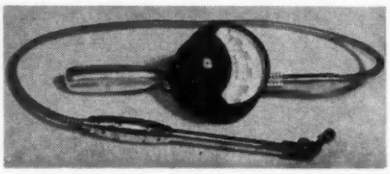
A universal wheel puller and adaptor, covering approximately 98 per cent of all cars requiring a puller, has been added to its line by the Bonney Forge & Tool Works, Allentown, Pa. The puller has adjustable legs which can be adapted to any hub regardless of number of studs, providing bolt circle is no greater than 7½ in.

P2. Gearless Angle Grinder

Ingersoll-Rand Co., New York City, introduces a new air-powered, direct drive angle grinder. Its design eliminates the need of gears of any kind. The new size 2FA-60 angle grinder speed at 90 psi air pressure is 6000 rpm. Two types of dead handles are available. They may be attached to either side of the grinder, and the angle dead handle may be rotated to any one of four positions, so that the tool can easily be adapted for corner grinding or for right or left handed operators.

P3. Windshield Cleaner

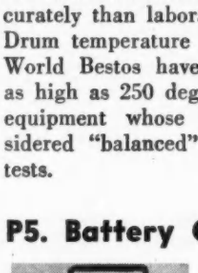
A new windshield-washer fluid developed by Automotive Solvents and Specialties, Inc., St. Clair Shores, Mich., is said to be an efficient glass cleaner, especially effective against bug spatter and other windshield debris. Designed for both winter and summer use, it protects the washer jar against freezing and prevents ice formation on the windshield when the jets are used in sub-freezing weather. Non-inflammable. VIZO does not evaporate.



P4. Brake Pyrometer

Brake Drum Pyrometer, designed by World Bestos, New Castle, Ind., indicates brake drum temperatures on tractors and trailers after down-grade braking under full load. Relative drum temperatures "across the axle" indicate balanced or unbalanced condition of brakes. Brake drum temperatures, taken *on the job*, are said to indicate balanced condition of brakes more accurately than laboratory or shop tests. Drum temperature tests conducted by World Bestos have shown differences as high as 250 deg across the axle of equipment whose brakes were considered "balanced" by ordinary shop tests.

P5. Battery Chargers



A new line of battery chargers for 6 and 12 volt batteries has been announced by Fox Products Co., Philadelphia. The new models include No. H-612 multi-purpose Powercharger, a 20 amp charger for boost and slow charging, No. G-612 portable Powercharger, an easily carried charger for fast and slow charging and booster starting; No. L-612 Lo-Boy Deluxe, for both fast and slow charging with a built-in cell comparator tester; No. B-612 Hi-Boy Deluxe—a fast and slow charger with built-in comparator tester; and No. W-12 Tungar slow charger, an overnight series charger for groups of batteries. Most of these models come equipped with either Safety Therment Control or electric time control.

P6. Wheel Lift

A truck and tractor wheel lift of heavy-duty steel, weighing 8 lb, is available from Clark Distributors, Fresno, Cal. It is designed to fold and fit into the truck tool box for emergency tire changes on the highway. A heavier model, 10 lb, does not fold. It is constructed of polished cold rolled steel and has a roller on the bottom cross bar for easier mobility.

P7. Fuel Tanks

New models of gasoline and diesel truck fuel tanks which average up to 50 lb less weight are announced by Lintern Corp., Painesville, Ohio. The new model saddle tanks capacity ranges from 70 to 145 gal. They are manufactured to conform with proposed I.C.C. regulations.

P8. Spring Pin Fastener

Standard Pressed Steel Co., Jenkintown, Pa., is producing a self-locking, spring-pin fastener. The fastener, called the Sel-Lok spring pin, replaces tapered, grooved and dowel pins in all kinds of assemblies. It is said to be vibration proof, absorb shock, easy to insert and remove. It is available in diameters from 1/16 to ½ in. and in a wide variety of lengths. Pins can be had in carbon steel and in corrosion-resistant steel and, as specials, in copper-based and aluminum-based alloys.

The latest developments in parts, accessories, equipment and tools for the fleet shop

CIRCLE APPROPRIATE NUMBERS ON POSTCARD FOR MORE INFORMATION

P9. Lift Trucks

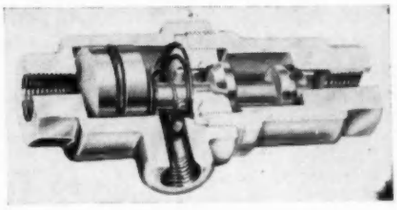
Four new HiDuty lift truck models, to be designated as the FLW series, have been announced by Transitier Truck Co., Portland, Ore. Standard on the new fork trucks are the new HiDuty Freelift feature, dual lever controls, and Waukesha industrial engines. The HiDuty Hydroflex clutch is retained as standard equipment on all models. The Freelift feature permits maximum fork lift height without increasing the collapsed height.

P10. Lockbolts

For permanent wood to metal fastening, Huck Mfg. Co., Detroit, has announced a new lockbolt, Model No. R-1018. It is available in 3/16 and ¼-in. dia. The pin is mild steel and the collar is 61S aluminum alloy. Using the company's pneumatic pull gun, the collar is permanently pulled up tight.

P11. Lift Muffler

A new air exhaust muffler designed to check noise and vapor mists of car lifts and other air operated equipment where air must be exhausted has been introduced by Allied Witan Co., Cleveland, Ohio. It is said to prevent injury from exhaust air, stop flying pipe scale and eliminate oil and water vapor mists. Features of the muffler are take-a-part metal construction and replaceable sound diffusing element.



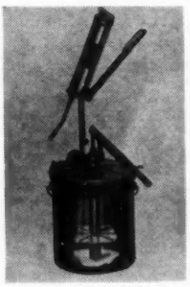
P12. Air Line Ejector

This automatic "spit valve" designed and built by George Mfg. Co., Philadelphia, Pa., features simplicity of construction and ease of maintenance. Model No. 1100 uses only five parts in the valve itself. The body comes apart quickly in event of cleaning becomes necessary.

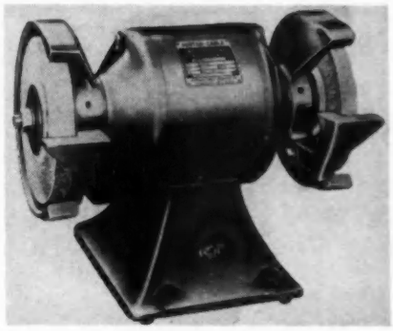
The valve is connected to either the bottom drain hole or the syphon drain hole of the tank and a tee is connected with the unloader line so that ejection of moisture, carbon and oil occurs with the cut-in or the cut-out of the air governor.

The valve can also be installed at the door unit of buses for automatic ejectioin of contaminants each time the door is opened or closed. Model No. 2000 operates on exhaust air from the quick release valve or the relay valve. Both valves are designed to operate at a minimum of 50 lb pressure to avoid waste of air in fanning of the brakes.

P13. Grease Gun Filler



A new dispenser to fill grease guns has been introduced by K-P Mfg. Co., Minneapolis, Minn. Called the GFD-400, the dispenser handles any grease gun equipped with a filler plug or that requires removal of the gun head for filling. It fills either through a filler valve fitting in the head of the gun, or through a filler plug on the side of the dispenser.



P14. Bench Grinders

A ¼ hp, double arbor, 6-in. lathe-type bench grinder has been introduced by Porter-Cable Machine Co., Syracuse, N. Y. The Model No. 116 takes 6 by ⅝-in. grinding wheels with ½-in. bore. The Model No. 517 is a ⅓ hp grinder taking 7 by ¾-in. grinding wheels with ½-in. bore. Model No. 518 is a ½ hp machine taking 8 by 1-in. wheels with ⅝-in. bore. Model No. 519 has a 1 hp motor, takes 10 by 1-in. wheels with ¾-in. bore.

P15. Shaft Bearing

Marion Metal Products Co., Marion, Ohio, is announcing a newly designed trouble-free drive shaft bearing. Designed to give longer bearing life, the new easier-to-install, Model No. DSB, is sealed to keep out road dirt and to retain the lubricant. Built around an anti-friction roller bearing, the new bearing has a heavy malleable iron casting body with a steel adjusting bolt and lubricator.

P16. Spark Plug Indicator

A new type spark plug indicator with a deep well spark view chamber that enables the mechanic to see at a glance how the spark plugs are firing, is announced by AC Spark Plug division, General Motors, Flint, Mich. The new indicator shows relative operating efficiency of old plugs.

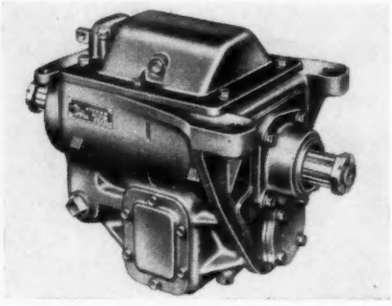
(TURN TO NEXT PAGE, PLEASE)

New Products

Continued from Page 91

P17. Transmission

Announcement of a remarkable new 4-speed truck auxiliary transmission for heavy duty truck operation is made by H. S. Watson Company. This auxili-



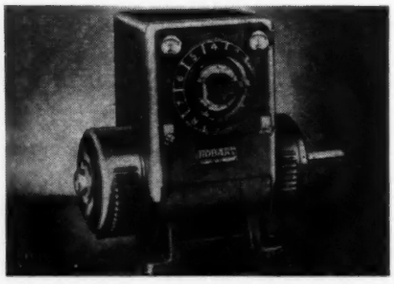
ary, Model No. 6041, is suitable for engines that have torque of about 375 ft lb. Its ratios are as follows; low underdrive 2.14 to 1, medium underdrive 1.24 to 1, direct 1.00 to 1, overdrive .86 to 1.

P18. Fast Charger

A new midget 6/12 volt fast charger is announced by King Electric Equipment Co., Cleveland, Ohio. The new model, No. BC-57, provides adjustable charging rates up to 80 amp for six volt batteries, and 40 amp for twelve volt batteries. The charging interval is controlled by a one hour moisture-proof time clock. At the termination of the fast charging period, the charger automatically switches to a slow, or "finishing" charge.

P19. Welding Generators

A complete new line of DC welding generators are now in production at Hobart Brothers Co., Troy, Ohio. They



are made for direct coupling to the customer's power source.

P20. Retractable Wheel Chock

A new retractable wheel chock, just introduced by Calumet Steel Castings Corp., Hammond, Ind., may well play an important part in future dock loading practices. In the past it has been impossible to block the truck or trailer tight against the dock because increased weight, as the vehicle is loaded, made it impossible to release the chock. With the Calumet device, however, a kick on the release mechanism collapses the chock which then can be picked up by the convenient handle. Recently we witnessed a truck being loaded with a 10,000-lb fork lift truck using no ramp or dock plate despite a discrepancy of about 2 in. in platform and floor height. The chock held the vehicle tight until loaded, was then easily released by means of the retractable mechanism.

The chock is fabricated of alloy steel castings and incorporates a bronze roller over the steel pin which acts as a hinge. The release mechanism is spring loaded. Accompanying photos, read from right to left, show block in position, being released and finally picked up. Some users who have been testing the device recommend that it be chained to the dock, others make it the responsibility of drivers..

P21. Trolley Extension Cord

Travalite, a new drop cord extension suspension, is being placed on the market by J. T. Templeton, Inc., Detroit, Mich. The complete unit includes six cadmium finished cars, a 50-ft steel trolley wire, wall fasteners, screws, cage light hook and full installation instructions. The special wall fasteners included with the package are designed with a "can't slip" slack tightener. Only a screw driver and wrench are necessary for installation. The trouble light cord is fastened to the wire trolleys, which in turn roll easily along the trolley wire.

P22. Aerial Platform

Tey Mfg. Co., Milford, Conn., announces production of the Hydro Sky Worker, a new model, hydraulically-operated, articulated boom for aerial work. Mounted on a truck, tractor or dolly, it can carry one or two men to a working position at any point in space within a 26 ft radius of the mooring. Elevations up to 44 ft working height are possible with the standard model.

P23. Truck Tire

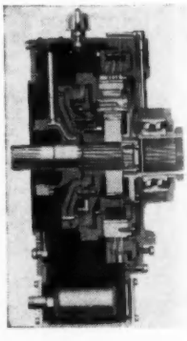
A new heavy-duty highway truck tire has been announced by The B. F. Goodrich Co., Akron, Ohio. The tire is molded with the beads close together so that when the tire is mounted, air pressure spreads the beads to rim width. The sidewalls then act as levers and put the tread under compression.

P24. Hydraulic Tailgate

Marion Metal Products Co., Marion, Ohio, is announcing several improvements in its hydraulic power tailgate. Locking and lifting controls are now fully coordinated so that it is not necessary for the operator to dismount in order to unlock the gate. It lowers to ground level, or stops and holds at any height. Designed to fit old or new model trucks, it handles up to 2000 lb. Hydraulic controls are interlocking to insure proper sequence of operations. "Dead-man" control is a standard safety feature.

P25. Transmission

A new oil-actuated, 2-Speed transmission, developed to obtain extended full-range performance from hydraulic torque converters, is announced by Twin Disc Clutch Co., Hydraulic Division, Rockford, Ill.



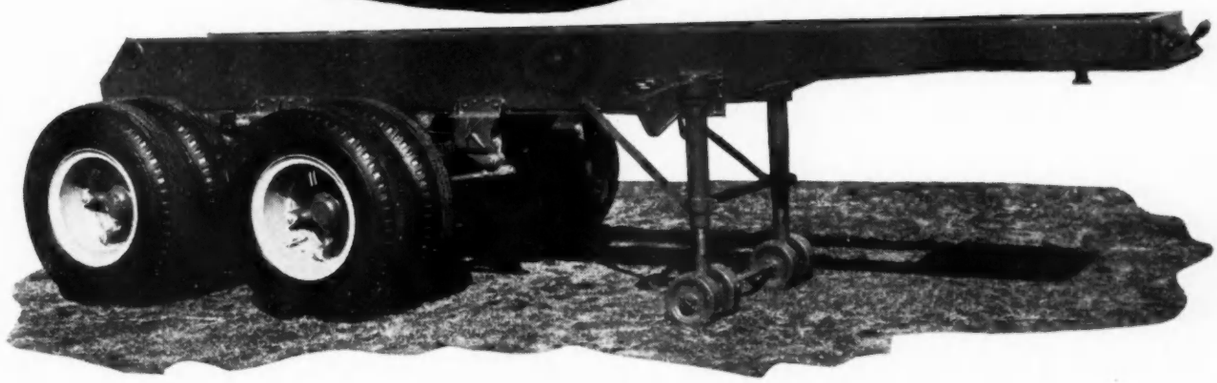
The new transmission. Model No. T-302. is equipped with a direct drive and single stage planetary gear system. Two ratio spreads are available; direct drive and 2.69:1 reduction. or direct drive and 3.07:1 reduction ratio. It uses hydraulically actuated clutches.

WE ARE *NOT* INTERESTED

If you are looking for a trailer with limited life and usefulness . . .

BUT *If you need equipment that will give many years of trouble-free operation . . .*

Kingham HAS THE ANSWER



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FULL TRAILERS

Kingham Dealership offers unlimited sales possibilities . . . Desirable Territories are open to responsible parties . . . Write for particulars.

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NATIONAL AND FOREIGN REPRESENTATION AND SERVICE

"A load behind is a trip ahead"

KINGHAM TRAILER COMPANY — LOUISVILLE 10, KY.

Utility Operators

Swap Maintenance and Operating Ideas

Chicago meeting reveals that majority do most of their own maintenance, are putting more emphasis on driver training and awards, economizing with outside storage

THE JOINT Motor Vehicle Committees of the American Gas Association and the Edison Electric Institute met in Chicago the middle of last month, as they have for the past twenty-eight years, to swap fleet operating ideas on a friendly informal basis.

One of the subjects which created a maximum of interest concerned the amount of maintenance work done by the typical public utility. S. G. (Jack) Page of Pittsburgh kicked off the discussion by reporting the results of a questionnaire returned by 39 member companies. Of the 39, 29 did 20 per cent or more of all their maintenance in their own shops. The other 10 ranged from 21 per cent "farmed out" to 1 who farmed out all of his maintenance.

In the discussion which followed it was generally conceded that the small operator would farm out such operations as crankshaft regrinding, cylinder reboring, line boring, glass work and radiator work. Beyond these established categories were such border line operations as body repairs, painting, tire service and exchange of small units. With these categories out of the way, it was generally conceded that most all other operations were done in the company owned shops. Majority opinion was overwhelmingly in favor of the greater economy and greater efficiency of work accomplished in the fleet's own shop.

Driver Training

ANOTHER report indicated the surprising fact that few among the utility group had any definite, clearly defined program for driver training. A marked exception was the case of the Long Island Lighting Company wherein safety co-ordinator Vincent A. Howell presented an excellent paper on the driver training program instituted by his company. The program is divided into six major parts. Very briefly summarized they include: 1. statistics, or the why of driver training and its effect on company operating policies; 2. items of general knowledge including such factors as rules of the road, state and local, the effect of centrifugal force, momentum, gravity, etc., and safe driving which incorporates this statement "Safe and courteous driving is always to be considered one of the most important factors of giving service with safety"; 3. a general knowledge of the vehicle itself including a check for safety equipment, pride in the vehicle (preventive maintenance) and special instructions for such equipment as winches, derricks. hydraulic lifts, etc.; 4. a thorough explanation of psycho-physical tests which are used extensively by the company; 5. actual field training including backing, turning, passing, parking, placing of flags and signs, smooth operation, etc.; 6. printed instructions and films on safety practices. Recently the training division has produced a sound film entitled "What Happened?" In it are included six major sources of accidents in the past few years and a discussion on *attitude* and its effect on driver performance.

Driver Awards

AT a later session there were indications that more of the group had driver training programs than the original survey indicated, though most were of an informal nature. By a showing of hands only a handful were yet participating in any definite award plan for driver no-accident records. But the interest in a discussion led by W. E. Albright of Philadelphia Gas Works indicated that many were actively working on some sort of recognition programs including safe driving award certificates and pins. While few had allocated an appreciable monetary fund for their safety programs, those who had were unanimous in the belief that the cost of safety recognition was well offset by reduction in accident costs.

Inside vs Outside Storage

THE old bugaboo of inside versus outside storage came in for another rather thorough airing. Randy Whitfield, perennial idea man for Georgia Power Co. in Atlanta, came up with some statistics. His calculations showed that in Atlanta, it costs $150 per year per vehicle to store inside, or a total of $750 for an expected five-year life of the vehicle. While he readily admitted that inside storage was always preferable and in some northern climates is a definite necessity, he figures that in the average territory, inside storage is definitely not worth the $750 expenditure. White there are definitely intangible aspects involved, one extra paint job at an approximate cost of $50 is just

(TURN TO PAGE 156, PLEASE)

Bendix

AIR-PAK

changes air pressure into hydraulic pressure for completely dependable braking

Bendix* AIR-PAK is a compact, power-braking unit that changes air pressure into hydraulic pressure by means of two directly connected pistons. A non-compressible column of brake fluid instead of air connects between the driver's foot and the brake. In an emergency situation, if air pressure fails for any reason or if braking is required before air pressure builds up, brakes can be applied instantly by foot power alone.

Designed to combine all of the well-known advantages of hydraulic brake actuation with an air brake system, AIR-PAK offers faster brake action, more positive and better control.

Add to these outstanding performance characteristics the fact that AIR-PAK is a product of Bendix, designer and builder of Hydrovac*, the world's most widely used power brake with OVER THREE MILLION UNITS in use, and you have an unbeatable combination for the utmost in braking efficiency.

For truck manufacturers or operators interested in AIR-PAK, a descriptive folder is available on request.

*REG. U.S. PAT. OFF.

THE MOST TRUSTED NAME IN BRAKING

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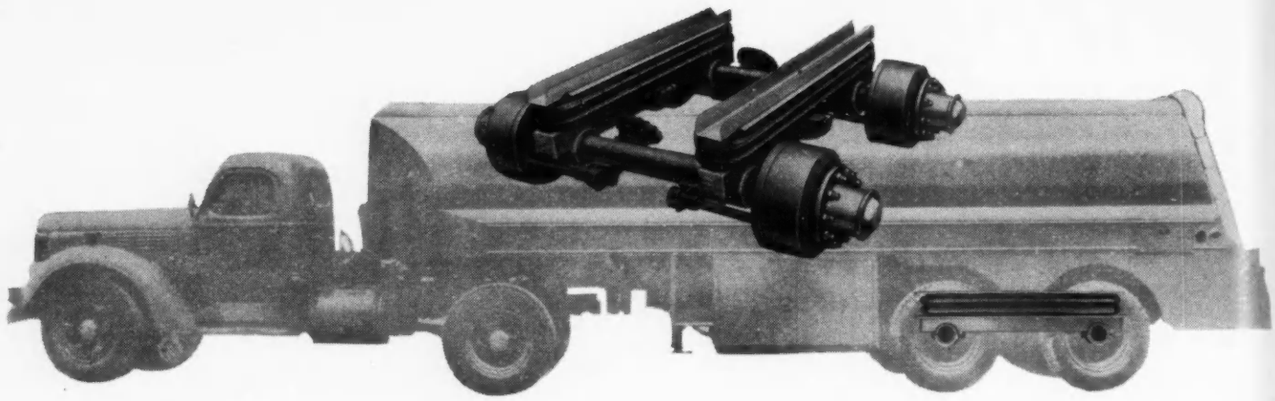
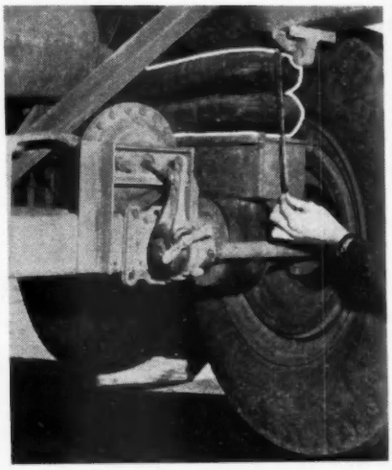


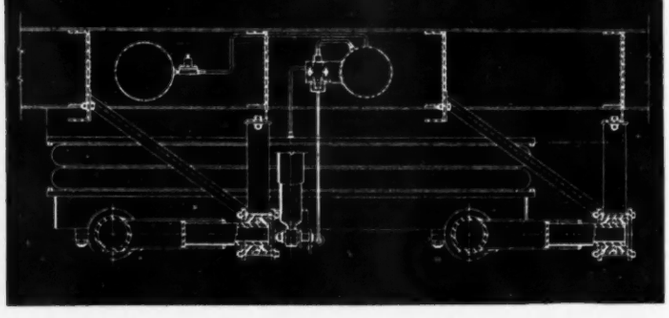
Above. Individual bellows replace springs, improve ride, cut weight

Expansion of bellows is relatively low. Weight automatically adjusts valve in each unit to permit sufficient pressure to level load under varying conditions



Air Springs for Tandems

Inflated rubber bellows support the load evenly, iron out shocks, cut weight by 300 lb



Separate tanks are located above the unit. Air lines travel directly to valves in each bellows. Maximum air pressure required 50 lb

THE General Tire and Rubber Co. is now in production of a new bellows type air spring. Primarily designed for tandem axle semi-trailer suspension, experimental installations for both single and tendem axle truck suspensions are under way. Designed to keep the floor of trailers parallel to the axles regardless of shifting loads, misloading or high crowned roads, the system incorporates a controlled air pressure feature which automatically compensates for road and shock variations.

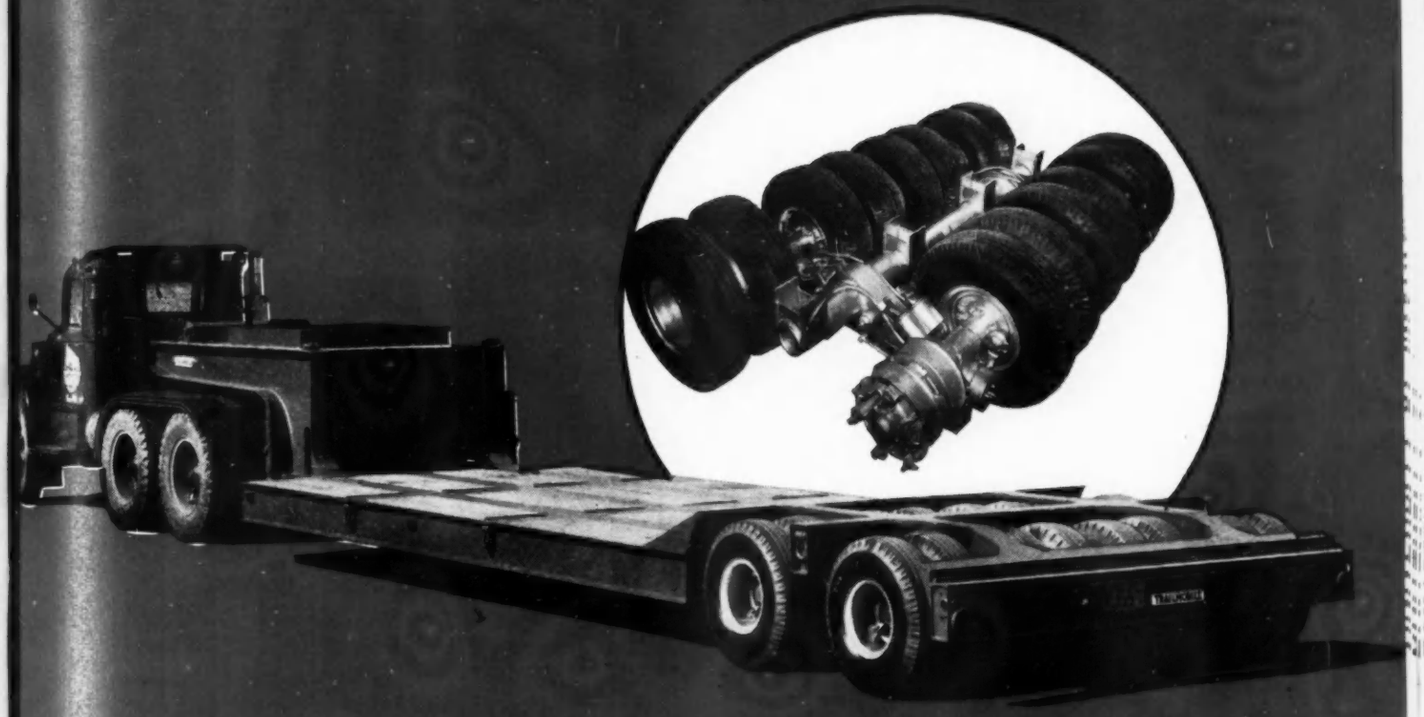
Individual inflated rubber bellows on each side support the load. Air pressure from separate reservoirs is controlled by a mechanical valve located inside each bellows. As the valve is forced open with weight of the load, air is admitted into the bellows in direct proportion to the load requirements. Normal air pressure for loaded trailers is between 40 and 50 lb. Pressure in unloaded trailers averages about 10 lb. Because of small apertures in the valve, shock loads are not transferred to the body.

In this design the weight of the vehicle and load are distributed over 5½ ft of the frame, rather than concentrated at local points. Rubber pads within the air springs support the load in event of failure of the air supply. The air springs assembly

(TURN TO PAGE 110, PLEASE)

TRAILMOBILE

USES SHULER AXLES



THERE ARE NO BETTER AXLES, AT ANY PRICE!

Since 1915, Manufacturers of: *One-Piece* Tubular and Square Commercial Trailer Axles, Heavy-Duty Front Axles for Trucks, Busses, and Off-Highway Equipment, Low-Bed Machinery Trailer Axles, Heavy-Duty Vacuum and Air Brakes, Miscellaneous Forgings.

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SOUTHWEST WAREHOUSE
301 N. W. 28th St., Fort Worth

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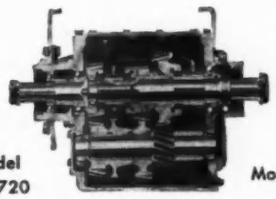
1238 N. W. Glisan St., Portland

1953 New Truck Registrations by Makes by States*

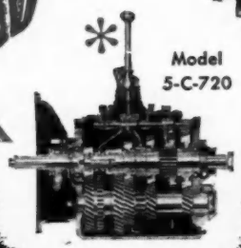
STATE AND MONTH		Auto-car	Brock-way	Chev-rolet	Dia-mond T	Divco	Dodge	Fed-eral	Ford	FWD	GMC	Inter-na-tional	Ken-worth	Mack	Peter-bilt	Pon-tiac	Reo	Stude-baker	White	Willys	All Others	Total
Alabama	Feb.	4	.....	566	1	.....	156	.....	259	.....	153	94	.....	20	.....	.....	1	49	23	23	.....	1,349
	2 Mos.	5	.....	1292	4	2	327	6	650	.....	334	202	.....	27	.....	.....	3	85	34	37	.....	3,006
Arizona	Feb.	.....	.....	155	1	.....	49	.....	101	.....	56	36	3	5	.....	.....	6	24	8	8	.....	452
	2 Mos.	.....	.....	322	3	.....	95	.....	226	.....	124	102	5	16	.....	.....	12	39	12	22	.....	978
Arkansas	Feb.	.....	.....	570	.....	.....	112	.....	272	.....	190	126	.....	.....	.....	.....	.....	48	6	18	.....	1,342
	2 Mos.	.....	.....	1421	2	.....	298	1	901	.....	499	306	.....	1	.....	.....	5	118	17	45	.....	3,614
California	Feb.	12	.....	2000	28	20	768	.....	854	2	605	563	15	15	.....	4	26	180	47	160	8	5,307
	2 Mos.	24	.....	3985	56	39	1640	1	2168	3	1364	1210	36	31	10	6	46	362	80	355	30	11,446
Colorado	Feb.	1	.....	329	12	3	82	2	206	5	107	105	.....	4	.....	.....	3	38	1	32	.....	930
	2 Mos.	5	.....	688	22	4	148	5	466	6	235	236	3	8	.....	.....	5	79	3	75	.....	1,988
Connecticut	Feb.	4	4	180	5	5	56	4	98	.....	37	40	.....	6	.....	.....	4	16	8	35	1	503
	2 Mos.	5	6	330	9	14	127	9	238	.....	79	98	.....	14	.....	.....	12	40	13	54	1	1,049
Delaware	Feb.	1	1	125	.....	.....	18	.....	59	.....	24	32	.....	2	.....	.....	2	11	.....	2	.....	277
	2 Mos.	1	1	173	.....	.....	28	5	81	.....	32	49	.....	4	.....	.....	3	19	2	3	.....	401
Dist. of Columbia	Feb.	3	.....	53	12	.....	17	.....	40	.....	11	9	.....	.....	.....	.....	.....	2	.....	2	.....	149
	2 Mos.	3	.....	116	12	5	33	1	73	.....	23	22	.....	1	.....	.....	5	3	2	5	.....	304
Florida	Feb.	2	.....	687	3	12	211	2	444	.....	180	175	.....	33	.....	.....	16	82	22	68	3	1,940
	2 Mos.	8	.....	1337	11	15	421	5	900	.....	340	345	.....	64	.....	1	31	191	49	122	5	3,845
Georgia	Feb.	.....	.....	780	3	.....	202	.....	303	.....	225	160	.....	6	.....	.....	3	83	27	18	.....	1,810
	2 Mos.	2	1	1466	4	1	407	.....	830	.....	442	352	.....	26	.....	1	7	158	46	30	.....	3,773
Idaho	Feb.	.....	.....	175	2	.....	73	.....	155	.....	83	101	2	3	1	.....	.....	29	3	49	.....	676
	2 Mos.	.....	.....	397	4	.....	119	.....	293	.....	181	203	5	20	1	1	.....	53	4	105	2	1,388
Illinois	Feb.	2	.....	1632	25	11	561	3	1157	1	324	622	.....	13	.....	4	3	130	40	74	9	4,611
	2 Mos.	2	.....	2707	59	20	878	3	1780	1	539	952	.....	18	.....	7	9	229	80	153	16	7,453
Indiana	Feb.	3	.....	501	9	11	186	.....	410	.....	145	279	.....	9	.....	.....	7	93	39	16	.....	1,708
	2 Mos.	3	.....	1078	14	11	416	1	879	.....	283	548	.....	20	.....	.....	17	168	73	54	2	3,567
Iowa	Feb.	.....	.....	465	8	1	107	.....	441	1	105	278	2	7	.....	1	6	40	26	20	.....	1,508
	2 Mos.	.....	.....	846	11	2	209	.....	737	3	184	498	2	7	.....	1	8	78	40	35	12	2,673
Kansas	Feb.	.....	.....	361	2	2	72	.....	247	.....	105	125	.....	.....	.....	1	3	28	4	23	1	974
	2 Mos.	.....	.....	872	4	3	181	.....	644	.....	261	346	.....	.....	.....	2	4	71	34	66	2	2,490
Kentucky	Feb.	.....	.....	558	1	1	120	1	208	.....	162	164	.....	3	.....	2	2	45	11	39	.....	1,317
	2 Mos.	.....	.....	1259	3	2	260	7	671	.....	332	339	.....	7	.....	2	6	97	18	91	.....	3,094
Louisiana	Feb.	.....	.....	571	2	2	143	.....	329	.....	166	174	.....	9	.....	.....	1	77	6	27	.....	1,507
	2 Mos.	.....	.....	1298	5	2	328	.....	843	.....	361	382	.....	16	.....	.....	1	148	11	52	.....	3,447
Maine	Feb.	.....	2	97	1	1	34	.....	70	.....	45	25	.....	2	.....	.....	1	16	.....	20	.....	314
	2 Mos.	1	2	279	3	3	98	.....	215	1	134	100	.....	17	.....	.....	4	48	5	40	5	955
Maryland	Feb.	3	9	246	.....	.....	117	1	163	.....	33	68	.....	10	.....	.....	.....	19	17	15	.....	701
	2 Mos.	5	15	529	2	.....	239	2	402	1	98	145	.....	18	.....	.....	5	38	26	36	1	1,562
Massachusetts	Feb.	10	6	282	3	2	92	.....	111	.....	66	67	.....	11	.....	2	6	25	14	41	3	741
	2 Mos.	13	18	485	8	9	170	7	272	.....	114	123	.....	36	.....	5	14	52	20	73	3	1,422
Michigan	Feb.	.....	.....	1233	14	17	515	17	718	.....	263	224	.....	10	.....	1	25	40	21	44	2	3,144
	2 Mos.	4	.....	2351	27	32	897	56	1635	.....	514	437	.....	15	.....	2	45	103	37	82	4	6,241
Minnesota	Feb.	.....	.....	504	3	1	125	1	466	3	98	223	.....	2	.....	1	4	36	10	23	.....	1,500
	2 Mos.	.....	.....	910	5	4	241	1	764	6	183	408	.....	2	.....	3	8	73	15	64	1	2,688
Mississippi	Feb.	.....	.....	661	.....	.....	127	.....	406	.....	229	153	.....	1	.....	.....	1	71	4	15	.....	1,668
	2 Mos.	.....	.....	1155	1	.....	228	.....	722	.....	421	312	.....	3	.....	1	1	108	5	30	.....	2,987
Missouri	Feb.	.....	.....	610	4	3	133	.....	365	.....	175	123	.....	3	.....	.....	5	38	10	14	.....	1,483
	2 Mos.	.....	.....	1070	5	4	270	.....	623	.....	329	210	.....	8	.....	.....	7	71	21	32	.....	2,650
Montana	Feb.	.....	.....	159	.....	.....	25	.....	169	1	42	88	6	.....	.....	.....	1	15	5	47	2	560
	2 Mos.	.....	.....	274	.....	.....	66	.....	311	1	88	165	8	3	.....	.....	4	38	6	83	4	1,051
Nebraska	Feb.	1	.....	405	10	1	68	.....	287	2	71	153	1	1	.....	1	1	28	11	45	.....	1,066
	2 Mos.	1	.....	800	23	2	136	.....	586	3	189	400	3	4	.....	3	2	64	25	87	4	2,332
Nevada	Feb.	.....	.....	51	.....	.....	21	.....	27	.....	23	6	.....	.....	.....	.....	.....	5	.....	8	.....	141
	2 Mos.	.....	.....	96	.....	.....	51	.....	62	.....	51	18	.....	1	.....	.....	.....	13	.....	20	.....	312
New Hampshire	Feb.	1	.....	68	.....	.....	13	.....	38	.....	20	15	.....	3	.....	1	3	10	1	11	.....	184
	2 Mos.	1	2	132	.....	.....	29	.....	84	.....	34	32	.....	7	.....	1	4	16	3	32	.....	377
New Jersey	Feb.	8	12	450	3	9	151	2	361	.....	113	115	.....	14	.....	1	4	29	55	21	1	1,349
	2 Mos.	15	44	932	8	26	314	12	897	3	273	258	.....	37	.....	1	11	68	99	44	2	3,044
New Mexico	Feb.	.....	.....	101	.....	.....	37	.....	62	.....	29	27	.....	7	.....	.....	.....	17	4	13	.....	297
	2 Mos.	.....	.....	204	.....	.....	59	.....	115	.....	61	57	.....	8	.....	.....	1	21	4	20	.....	550
New York	Feb.	14	94	1076	9	14	493	9	702	3	314	379	.....	47	.....	1	35	72	47	92	7	3,408
	2 Mos.	22	154	2128	29	20	1115	14	1520	8	575	725	.....	123	.....	10	74	149	116	181	23	6,988
North Carolina	Feb.	1	.....	626	1	4	149	.....	395	.....	178	198	.....	13	.....	1	3	65	35	30	3	1,702
	2 Mos.	7	.....	1496	5	6	378	.....	1032	1	419	462	.....	39	.....	3	5	152	93	68	3	4,169
North Dakota	Feb.	1	.....	101	.....	.....	26	.....	159	.....	24	75	.....	1	.....	.....	.....	10	1	6	.....	404
	2 Mos.	1	.....	257	.....	.....	77	.....	333	.....	61	221	.....	2	.....	.....	1	31	3	15	.....	1,002
Ohio	Feb.	11	.....	980	11	15	432	5	613	1	178	363	.....	23	.....	1	23	66	102	59	.....	2,883
	2 Mos.	25	1	1991	23	23	807	19	1550	4	444	744	.....	47	.....	4	43	153	153	117	2	6,150
Oklahoma	Feb.	.....	.....	691	.....	2	137	.....	500	5	194	209	2	6	.....	.....	5	66	20	14	.....	1,851
	2 Mos.	1	.....	1685	.....	8	337	.....	1178	10	461	477	2	8	.....	.....	10	134	50	46	.....	4,407
Oregon	Feb.	1	.....	204	11	.....	84	.....	277	1	95	137	9	2	1	1	1	23	4	65	1	917
	2 Mos.	5	.....	585	16	4	179	.....	544	2	210	251	20	9	12	2	3	54	18	143	2	2,059
Pennsylvania	Feb.	22	38	1172	10	12	485	5	869	.....	270	427	.....	41	.....	.....	20	81	51	62	3	3,568
	2 Mos.	31	72	1861	24	22	808	14	1420	.....	426	682	.....	80	.....	1	36	122	101	219	4	5,923
Rhode Island	Feb.	3	.....	63	4	3	24	.....	42	4	10	10	.....	2	.....	.....	2	5	5	4	.....	181
	2 Mos.	8	1	113	7	3	58	.....	95	4	31	37	.....	7	.....	.....	7	8	6	6	.....	391
South Carolina	Feb.	.....	.....	419	.....	.....	94	.....	193	.....	89	65	.....	3	.....	1	.....	30	5	17	2	918
	2 Mos.	.....	.....	896	2	1	209	.....	514	.....	207	172	.....	5	.....	1	.....	68	14	23	2	2,114
South Dakota	Feb.	.....	.....	122	.....	1	36	.....	113	.....	28	94	1	.....	.....	.....	.....	15	1	22	.....	433
	2 Mos.	.....	.....	298	3	1	92	1	257	.....	84	212	1	.....	.....	2	.....	49	6	59	.....	1,065
Tennessee	Feb.	.....	.....	638	3	1	179	15	345	.....	160	181	.....	8	.....	.....	4	29	9	14	.....	1,586
	2 Mos.	.....	.....	1336	4	1	371	16	825	.....	334	332	.....	12	.....	1	12	77	21	33	.....	3,375
Texas	Feb.	15	.....	2516	20	1	461	3	1753	.....	611	575	.....	16	.....	5	10	191	90	89	5	6,361
	2 Mos.	18	.....	5303	38	6	1031	8	3778	2	1286	1104	2	45	.....	7	21	393	167	198	6	13,413
Utah	Feb.	.....	.....	116	1	.....	24	.....	90	.....	39	45	3	2	2	.....	2	4	3	17	1	349
	2 Mos.	.....	.....	219	8	.....	53	2	194	2	61	98	6	4	2	.....	3	14	7	30	1	704
Vermont	Feb.	.....	.....	41	.....	.....	17	.....	26	.....	7	14	.....	.....	.....	.....	1	.....	.....	12	1	119
	2 Mos.	.....	2	114	.....	.....	40	.....	60	1	36	42	.....	5	.....	.....	2	8	.....	46	2	356
Virginia	Feb.	3	2	407	.....	1	178	2	168	.....	115	108	.....	14	.....	.....	10	46	7	25	2	1,088
	2 Mos.	4	3	851	.....	3	326	3	457	.....	256	207	.....	24	.....	.....	16	98	22	48	3	2,321
Washington	Feb.	.....	.....	250	.....	4	64	.....	165	.....	82	80	6	2	.....	1	1	11	4	17	.....	687
	2 Mos.	.....	.....	439	.....	5	126	.....	280	.....	149	125	9	5	.....	1	4	22	12	38	1	1,216
West Virginia	Feb.	.....	.....	247	1	8	92	4	183	.....	65	57	.....	7	.....	.....	1	17	14	44	.....	740
	2 Mos.	.....	.....	492	1	10	170	4	391	.....	137	135	.....	12	.....	.....	3	43	20	92	.....	1,510
Wisconsin	Feb.	.....	.....	476	3	3	146	.....	445	7	126	247	.....	2	.....	1	11	46	13	53	5	1,584
	2 Mos.	1	.....	879	8	7	244	.....	609	11	214	429	.....	8	.....	3	26	78	20	96	9	2,642
Wyoming	Feb.	.....	.....	97	1	.....	24	.....	72	1	28	51	.....	2	.....	.....	.....	4	1	28	.....	309
	2 Mos.	.....	.....	244	1	.....	57	.....	159	2	73	112	.....	6	.....	1	.....	11	2	60	.....	728
Total	February, 1953	126	168	24817	227	171	7536	76	15936	37	6498	7685	50	390	4	31	283	2105	835	1601	60	68,616
Total	February, 1952	147	137	19536	292	233	7306	57	13205	34	5971	6880	70	528	26	47	236	2137	795	1389	259	59,285
Total	2 Months, 1953	221	322	49991	474	320	15191	203	34264	75	13566	15422	102	880	25	73	546	4315	1615	3465	152	141,222
Total	2 Months, 1952	289	254	38991	580	487	15285	109	26191	110	11940	13530	117	1084	45	121	475	4251	1772	2867	468	118,948

* Data from R. L. Polk & Co.

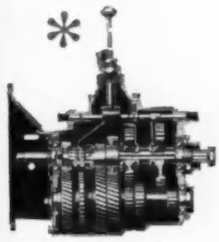


Model 3-A-65

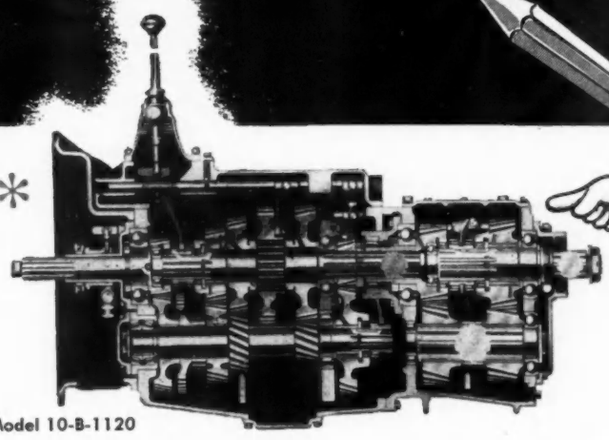
Model 5-C-720



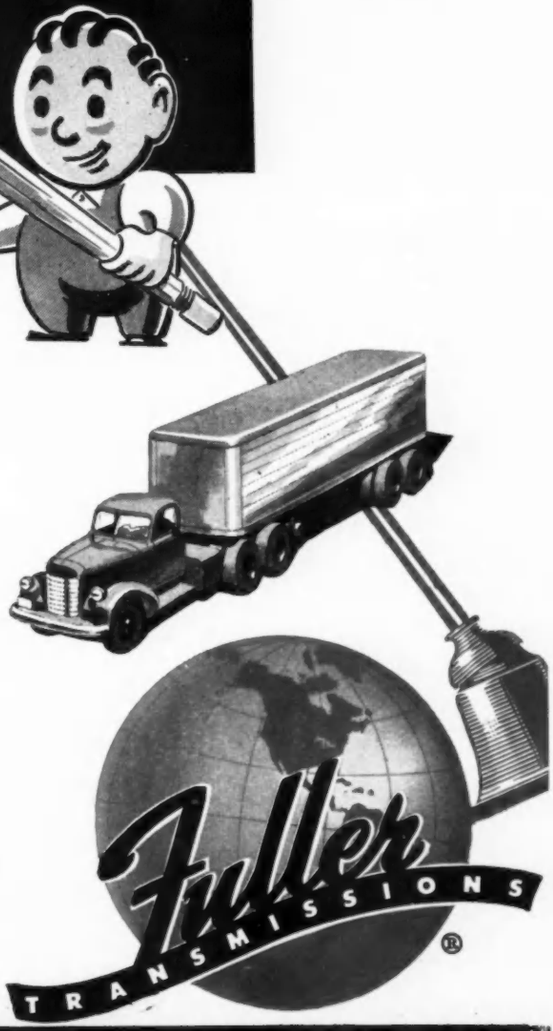
You write the Specifications!



Model 5-A-620



Model 10-B-1120



Before buying a new truck, you carefully consider all factors related to the job you'll want your truck to do . . . every road and load condition . . . everything that affects your particular operation.

You specify the "make" of truck . . . the type . . . the power plant . . .

* Specify the transmission, too!

Among the more than 110 Fuller Transmission models for every heavy-duty job—there is a "proved in service" unit to fit *your* job . . . designed to operate quietly and dependably . . . profitably . . . and built to stand up under the most grueling conditions, on or off the highway.

Write for Condensed Specification Folder.

Fuller® TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO 13F, MICHIGAN

Unit Drop Forge Division, Milwaukee 1, Wis. • WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS), 1060 E. 11th Street, Oakland 6, Calif.

Simple Record System

Continued from Page 78

of our records are set up that way. On the card we show a complete listing of specifications for the truck and its auxiliary equipment.

Around the perimeter of the card there is a series of holes divided into sections to show the make, year, body type, number of cylinders, weight, division, district and department, rear tire size, unit number. It also indicates whether the vehicle is equipped with a winch, and if so, its capacity, shows if the unit has a brake booster, pintle hook, split shaft power take off, derrick, metal roof on the body, spot light, two-way radio or a PUC permit. Additional holes are provided for recording any other information which may be desired at some future date.

When a card is being prepared for a vehicle, it is punched according to a coding scheme so that when the card is completed its margin has a pattern of holes and grooves.

Using numbers to signify facts permits a considerable amount of information to be shown by a single groove. The information capacity of the card is further increased by the following method:

Three-digit numbers are used to number the vehicles. The card has the heading "Unit Number" on the margin and three sections marked "hundreds," "tens" and "units." In each of these sections the figures 7, 4, 2 and 1 appear. Thus, in making up a card for, say, truck number 326, the operator would put a groove opposite the 2 and the 1 in the "hundreds" section, opposite the 2 in the "tens" section and opposite the 4 and the 2 in the "units" section.

With this system it can be seen that we can number vehicles up to 1199. Two-digit numbers are used when the number of possible differences in either equipment or say, tire size, make it necessary. For example a truck may have any one of 80 different sized tires or may be a product of any of some 35 different manufacturers. This can be indicated by two simple grooves, and by referring to a master code sheet the tire size or make of the truck may be easily determined.

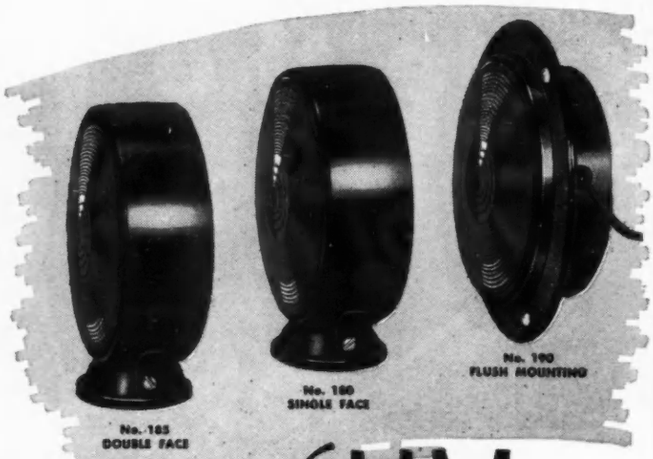
Sorting the cards is a simple procedure. When we want to remove the cards for all trucks equipped with two-way radios, all the clerk has to do is insert a sorting needle through all the cards at the hole marked "Radio" and lift. Cards for units equipped with radios are grooved at this hole and therefore slip out of the pile. The same procedure may be followed when separating the cards into other desired groups.

Returning the cards to the file is also a simple procedure, since it is merely a matter of sorting them into numerical order.

There are many uses for this system already, and we expect to find more as time passes. At present we find that it is useful to know how many trucks use a certain size tire so that we can set up and keep track of a spare tire inventory in our parts department. Other parts stocks can also be kept the same way, based on make and model of the trucks. For cost studies by location the cards can be quickly sorted to any desired location and costs run on these units as compared to some other location.

END

Please Resume Reading Page 79



DIETZ presents the new SLIM

DELUXE
CLASS "A" TYPE 1
DIRECTION SIGNALS

THE REGULAR MODEL
DIETZ CLASS "A" TYPE 1
DIRECTION SIGNALS

Lower price model featuring Stimsonite Lenses, single hollow stud mounting, snap ring lens retainer. Available with burn-out proof, self-cancelling or non-cancelling Switches.

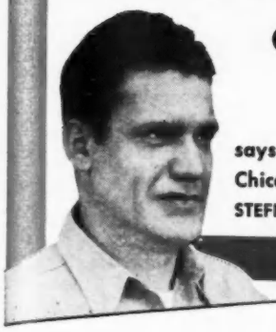
Exceed latest S.A.E. Specifications—State Approved • Tested by Electrical Testing Laboratories, Inc. • Scientifically designed Stimsonite Lenses.

SLIM	2⅛" in depth
SLEEK	No openings to let in water and dirt
STURDY	Single hollow stud mounting—no excessive vibration
PRACTICAL	Only one brass screw to service bulb or lens—round mounting.
SWITCH	Burn-out proof, self-cancelling or non-cancelling

R. E. DIETZ COMPANY • 225 WILKINSON ST. • SYRACUSE 1, N. Y.

OVER A CENTURY OF Safety LIGHTING DIETZ

"Wagner Air Brakes are more economical to operate because of low maintenance cost"



says: B. G. Maggenti,
Chicago Division
STEFFKE FREIGHT COMPANY, CHICAGO, ILLINOIS

STEFFKE FREIGHT COMPANY

3300 S. DAMEN AVENUE
CHICAGO 8, ILLINOIS

PHONE - CLIFFSIDE 4-1030

October 13, 1952

Wagner Electric Corporation
6400 Plymouth Avenue
St. Louis 14, Missouri

Gentlemen:

With a fleet the size of Steffke Freight, I have to make doubly sure that every vehicle that hauls over-the-road has been thoroughly checked to assure our drivers of safe, trouble-free performance when they're behind the wheel. When it comes to checking the air brake systems, I find that the units equipped with complete Wagner Air Brake Systems are usually in A-1 condition. In fact, some of these Wagner equipped units have operated continuously for over 3 years without a single case of compressor failure. Performance like this helps add to our safety record.

In looking over our records of maintenance expenses, I've noted that those units with Wagner Air Brake Systems have consistently required a minimum of maintenance. This proves to me that Wagner Air Brakes are more economical to operate because of low maintenance cost. In fact, our tractors with Wagner Air are more economical to maintain...operate more quietly...help minimize driver fatigue.

I'm very definitely sold on Wagner Air Brakes and do recommend Wagner Air to other fleet operators.

Very truly yours,
Bernard Maggenti
B. G. Maggenti
Chicago Division

BGM rw

HOME OFFICE: BOX 748 • WAUSAU, WISCONSIN

Like B. G. Maggenti, men who are responsible for fleet maintenance must make it a policy to keep repair and replacement expenditures at an absolute minimum. That's why so many of these men rely on the proven dependability of Wagner Air Brakes and Wagner Rotary Air Compressors. They've seen their tractor units equipped with Wagner Air Brakes perform efficiently mile after mile in heavy-duty hauling service . . . with complete assurance that Wagner Air Brake Systems give the greatest degree of safety on the road.

Regardless of the type of fleet you operate, Wagner Air Brakes and Wagner Rotary Air Compressors will provide trouble-free operation at lowest maintenance costs. You're assured of safety-tested engineered perfection. Wagner Air Brake Systems are backed by more than twenty-five years' experience in the manufacture of brakes and complete brake systems. Next time you order new units, make sure you specify Wagner Air Brakes with the exclusive Wagner Rotary Air Compressors . . . you can get full information by sending for your free copy of Wagner Bulletin KU-201A.

WAGNER AIR BRAKE USERS ARE OUR BIGGEST BOOSTERS

Wagner Electric Corporation
6470 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.
(Branches in Principal Cities in U. S. and in Canada)
LOCKHEED HYDRAULIC BRAKE PARTS and FLUID . . . NoRoL . . . CoMaX BRAKE LINING . . . AIR BRAKES . . . TACHOGRAPHS . . . ELECTRIC MOTORS . . . TRANSFORMERS . . . INDUSTRIAL BRAKES

K53-9

Public Relations, Highway Films

Continued from Page 69

THE ROAD AHEAD—15 min—stresses the importance of truck transportation with many excellent scenes of trucks at work. Free loan—4, 14.

SINGING WHEELS—23 min—portrays the part trucks play in building, distributing, and serving. A particularly dramatic sequence shows what would happen if trucks disappeared. Free loan—4.

TO NEW HORIZONS—17 min—depicts the development of transportation in the post war era. Free loan—14.

TRUCKS THAT SERVE OUR CITY—14 min—shows how trucks serve the modern city in respect to communication, food supply, sanitation, construction and as the necessary link between railroads and the consumers. Rent—13.

WHEELS OF PROGRESS—24 min—color film explaining how long haul motor freight operates including its history, background and highway safety. Shows how truck transportation serves the nation. Free loan—11.

Adequate Highways

BETTER AND SAFER HIGHWAYS—7 min—promotes public understanding of Project: Adequate Roads—Explains why our present roads are inadequate and what should be done to remedy the situation. Free loan—5.

HIGHWAYS AHEAD—29 min—color film tracing the history of our roads from Indian paths to superhighways. Free loan—6.

LET'S GET OUT OF THE MUDDLE—19 min—shows why our roads are inadequate, how rapidly increasing vehicle registrations and old, worn out roads combine to halt our progress. Shows why and what kind of better roads are needed. Free loan—3, 9.

THE LONGEST MILE—30 min—color film showing how the general public can join forces with county, state and federal highway officials to obtain better roads. Distribution limited to states east of the Mississippi River. Free loan—2.

PENNSYLVANIA'S HIGHWAY STORY—22 min—color film showing the importance of adequate highways to the state's economy. The story applies to any state. Free loan—3.

THE ROAD AHEAD—74 min—color film in three reels—shows the operation of a state highway department, administrative as well as operational problems and their solution. Designed for public showing, it shows what goes on in building adequate highways. Free loan—3.

END

Please Resume Reading Page 70

Years of research and experience have resulted in giving you all the answers to your heavy-duty braking problems. Mold-Blok is available in a friction range to give the best possible service for all jobs — old and new. You'll find Mold-Blok thoroughly dependable — proven best by test.

* Neither, it is a root.

MOLDED MATERIALS DIVISION
OF
CARLISLE CORPORATION
RIDGWAY, PA.

"Well, that's one more thing you can't do in a truck!"

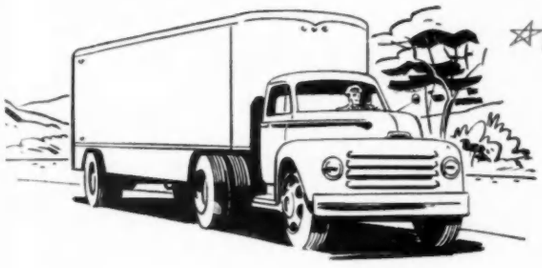
The "Unseen Differences" Built Into...

AUTO-LITE SERVICE PARTS

★ REDUCE COSTLY "BREAK DOWNS"

★ ASSURE BEST PERFORMANCE

★ HELP BOOST PROFITS



RIBBED ARM
helps provide extra strength with less weight . . . assures smooth, efficient performance even at highest speeds.
TUNGSTEN POINTS
of pure end-grained tungsten, withstand greater "pounding" and terrific arc heat of 3500° F. for long life.
RUBBING BLOCKS
of special material that withstands tests equivalent to 50,000 engine miles assuring accurate contact needed for best performance.
SERRATED SLEEVE
of a special design makes it impossible for bushing to slip or come loose . . . keeps close tolerance.

Auto-Lite Contact Sets are a typical example of how Auto-Lite Ignition Engineers have improved and developed—often through more costly design and manufacture—great "unseen differences" that help fleets keep rolling for bigger profits. These "unseen differences" built into Auto-Lite Original Service Parts guarantee best performance and dependability . . . proved by this fact: more than half of America's car and truck makers specify Auto-Lite. Insist on Auto-Lite quality in your fleet.

THE ELECTRIC AUTO-LITE COMPANY
Parts & Service Division
Toledo 1, Ohio

MONEY CANNOT BUY BETTER AUTOMOTIVE ELECTRICAL EQUIPMENT

ORIGINAL
AUTO-LITE
SERVICE PARTS

Reo's New Gold Comet Engine

Continued from Page 85

der block casting with bulkheads on the interior provide additional stiffness to permit greater load-carrying capacity without vibration.

The OH engine is fitted with the new Zollner Clear-O-Matic, heavy-duty aluminum alloy pistons with a special steel ring cast into the structure to control clearance with the cylinder bore. The concave dome as well as the top ring lands are anodized, while the skirt, including the area just above the wrist pin, is tin-plated.

The Eaton rotor oil pump is larger by 50 per cent, and has a capacity nominally rated at 12 gal per minute. A deeper oilpan lowers the oil level in the pan and thus prevents "dipping" when operating on severe grades. An oil cooler will be installed as standard equipment of all OH-160 models.

In summarizing the comparative features of the OA and OH engines from the standpoint of interchangeability, it may be noted that in the main only the following elements are similar: wet sleeves; valves and timing gears; water pump; electrical accessories.

Bhp and torque curves for the OH engine, reproduced here, are said to represent conservative ratings, using the 1952 SAE gasoline engine test code procedure and correction factors. Condensed mechanical specifications also are given in tabular form.

Where on-the-nose Accuracy Counts
Truck Tire Life Depends on Accurate Inflation
The slightest error in inflation pressure can reduce fleet tire life as much as 15%—inaccurate gauges can rob you of one-out-of-six tires. And proper inflation reduces accident hazards, too.
There can be no question—you get on-the-nose accuracy when you use an Eco Tireflator. Simply set the dial to the required pressure (range 5 to 110 lbs.), and apply the chuck—tires are quickly and automatically brought to exact pressure.
Various models are available—all meet Grade A testing specifications of the American Standards Association.
AIR
JOHN WOOD
Write for full information
JOHN WOOD COMPANY
BENNETT PUMP DIVISION
MUSKEGON, MICHIGAN

255 cu in. LP Gas Engine

A NEW and smaller Gold Comet engine, designed and built specifically for LP gas operation also has been announced by Reo Motors Inc. The new power plant, with a 255-cu in piston displacement, is the second LP gas engine put on the market by the company. The company entered the natural gas engine field last year with a 331-cu in model.

The new six-cylinder overhead valve model is available as an option in Reo's Model F-20 truck series which has a rated gross vehicle weight of 16,000 to 18,000 lb. It develops 100 hp at 3400 rpm and 182 ft lb of torque at 1600 rpm.

Many of the design features of the Gold Comet gasoline engine of the same displacement and of the 331 cu in. LP gas model are incorporated in the new engine. It differs from the gasoline model in the following major components: a divorsed carburetor adapter and manifold; a redesigned cylinder head which results in a compression ratio of 7.15 to 1; intake valve seat inserts and rotocaps on the exhaust valves; cast iron top ring; cast iron exhaust valve guides, and distributor. Each of these components has been separately designed for this model.

The air cleaner is mounted outside the hood to permit the fuel-air mixture to enter the cylinders as cool as possible. Ensign fuel filter, combination regulator and vaporized and downdraft-type carburetor are used.

Like other Gold Comet models, the new LP gas unit is designed for maximum interchangeability of parts. It has replaceable cylinder sleeves, integral intake manifold and a 3⅝ in. by 4⅛ in. bore and stroke.

In addition to its use on the F-20, the new engine is available as a complete kit, including all mounting brackets and necessary accessories.

END

Please Resume Reading Page 86

THE ENGINEER'S REPORT

DATA

LUBRICANT RPM Chassis Grease T-B

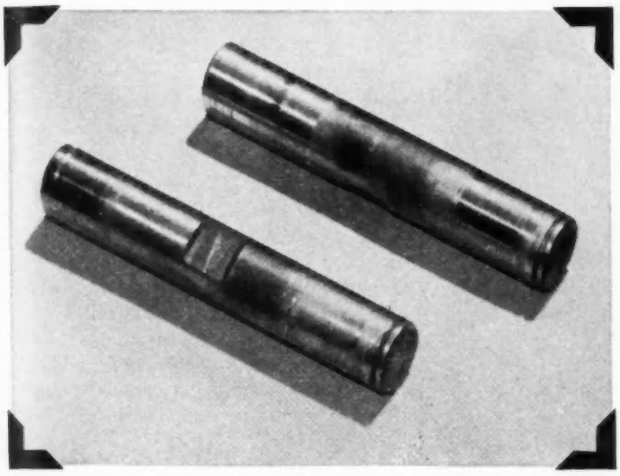
UNIT 30-passenger bus

PARTS Chassis bearings

CONDITIONS 30% overloads on rough roads
Water fords - extreme heat

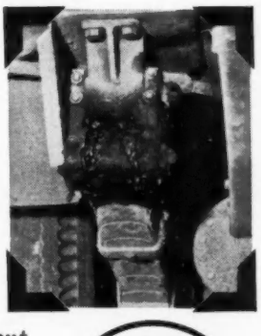
FIRM Eli B. May Service Co.,
Bakersfield, Calif.

Practically no wear on king pins in 1/4-million miles tough service



LUBRICATED WITH RPM CHASSIS GREASE T-B at extended intervals of 2000 to 3000 miles, these king pins were in service 245,692 miles in a bus that almost daily had to ford hub-deep irrigation water ponds on unpaved country roads. As the picture shows, they are still good for many miles of service. Due to the excessive washing action of the water and summer temperatures up to 114 degrees, other greases tried would not stay on chassis bearings.

A PROTECTIVE COLLAR of the grease stayed at the outer edges of bearings, acted as a seal and helped maintain a tough lubricating film inside. The film stayed on the bearings throughout the long service intervals although the bus often carried loads 30% over rated capacity, and numerous stops and chuck holes caused excessive shock loading.

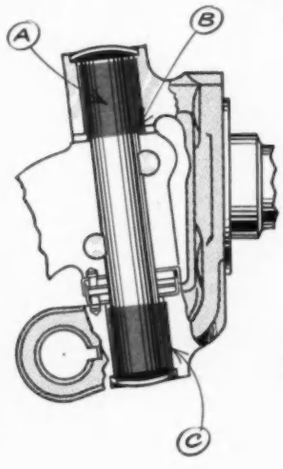


REMARKS: This is only one of about 30 busses maintained for various lines by Eli B. May Service Co. Mr. May says, "We've tried many chassis greases, but RPM Chassis Grease T-B is the only one that we've found entirely satisfactory."

RPM

TRADEMARK "RPM" REG. U.S. PAT. OFF.

How RPM Chassis Grease T-B sticks on bearings, prevents wear



A. Contains metallic anti-wear agent and heavy oil stocks—increases film strength and resists wear.

B. Stringiness agent provides high adhesion and cohesion properties—will not squeeze out of bearings, helps seal out grit and water.

C. Has excellent pumpability in cold weather—assures constant lubrication.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor handling them, write or call any of the companies listed below.

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Don't Spare the Rods

Continued from Page 70

gasoline as the fuel, loads, trying to shorten the rod, can amount to as much as 6 or 7 tons. Such loadings can be applied as often as one thousand times a minute with the rod placed in tension during some other part of the cycle.

Add all of this to the general flailing of the big end of the connecting rod, plus engine operation between zero degrees, or below, at cold starting, to as much as 300 deg F actual oil temperature in desert country, with perhaps constant temperature changes in between, and you have the typical connecting rod in modern truck usage.

Bore distortion is caused by the combination of load variations and the relieving of internal stresses in the rod due to constant operational temperature changes. This can also affect the bolts, possibly to a lesser degree.

Anyway, we know that the rod does go out-of-round through use—not all rods, but enough to make it advisable to check them.

Similarly, the big end bore of a connecting rod becomes enlarged. Some of the growth could also be attributed to either the surface finish of the rod becoming worn through the loading or actual minute movement of the previous bearings.

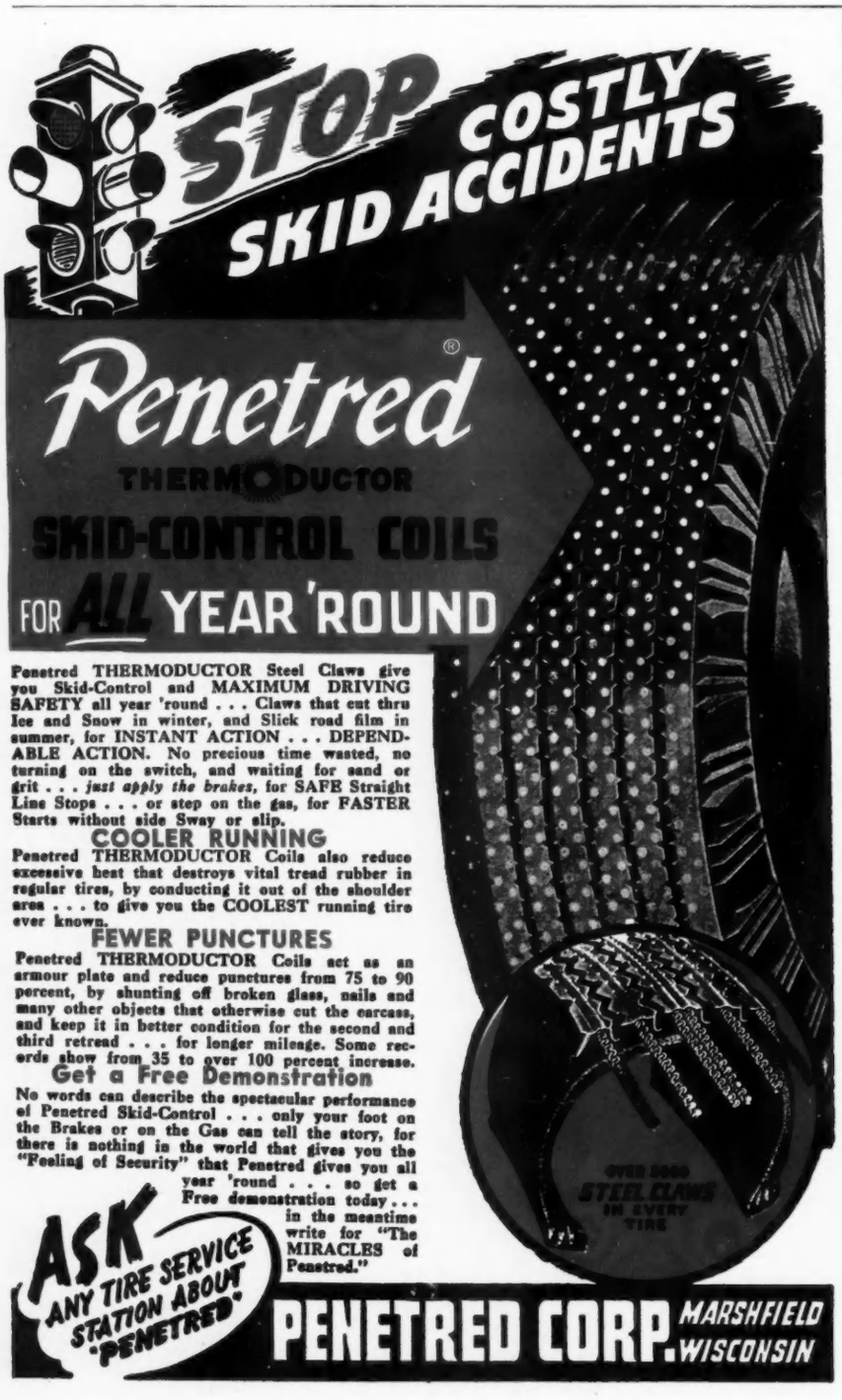
Enlarged bores cause any subsequent rod bearings assembled in them to show indications of looseness. The bearing will break if the condition is aggravated.

The connecting rod shank becomes bent or twisted in some engines, possibly because of previous misalignments or again because of earlier internal rod blade stresses.

As is already known, the piston pin bushing fit with the piston pin is very important. On many occasions, the replacement of the bushing itself is mandatory. This can be due to bushing wear or in a few instances to a breakdown caused by a combination of excessive heat in the piston and the loading.

The last and rarest connecting rod malady is generally classed as a misfit

(TURN TO PAGE 108, PLEASE)


STOP COSTLY SKID ACCIDENTS
Penetred®
THERMODUCTOR
SKID-CONTROL COILS
FOR ALL YEAR 'ROUND
Penetred THERMODUCTOR Steel Claws give you Skid-Control and MAXIMUM DRIVING SAFETY all year 'round . . . Claws that cut thru Ice and Snow in winter, and Slick road film in summer, for INSTANT ACTION . . . DEPENDABLE ACTION. No precious time wasted, no turning on the switch, and waiting for sand or grit . . . just apply the brakes, for SAFE Straight Line Stops . . . or step on the gas, for FASTER Starts without side Sway or slip.
COOLER RUNNING
Penetred THERMODUCTOR Coils also reduce excessive heat that destroys vital tread rubber in regular tires, by conducting it out of the shoulder area . . . to give you the COOLEST running tire ever known.
FEWER PUNCTURES
Penetred THERMODUCTOR Coils act as an armour plate and reduce punctures from 75 to 90 percent, by shunting off broken glass, nails and many other objects that otherwise cut the carcass, and keep it in better condition for the second and third retread . . . for longer mileage. Some records show from 35 to over 100 percent increase.
Get a Free Demonstration
No words can describe the spectacular performance of Penetred Skid-Control . . . only your foot on the Brakes or on the Gas can tell the story, for there is nothing in the world that gives you the "Feeling of Security" that Penetred gives you all year 'round . . . so get a Free demonstration today . . . in the meantime write for "The MIRACLES of Penetred."
OVER 5000 STEEL CLAWS IN EVERY TIRE
ASK ANY TIRE SERVICE STATION ABOUT "PENETRED"
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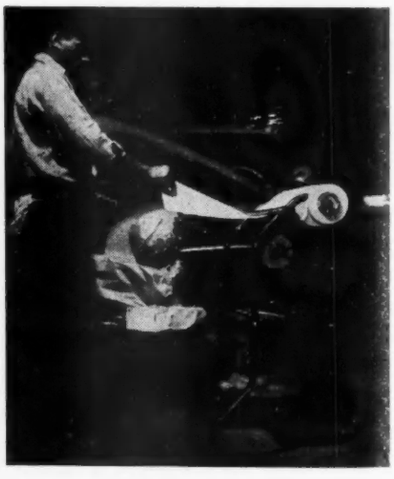
Saves Time This Way



Yellow Cab Co. in Philadelphia is one of many fleet operators who save materially on masking time by using an automatic tape and masking paper dispenser. Available from several suppliers, this one by Industrial Tape Corp., New Brunswick, N. J., feeds various widths of paper and tape from one stand.

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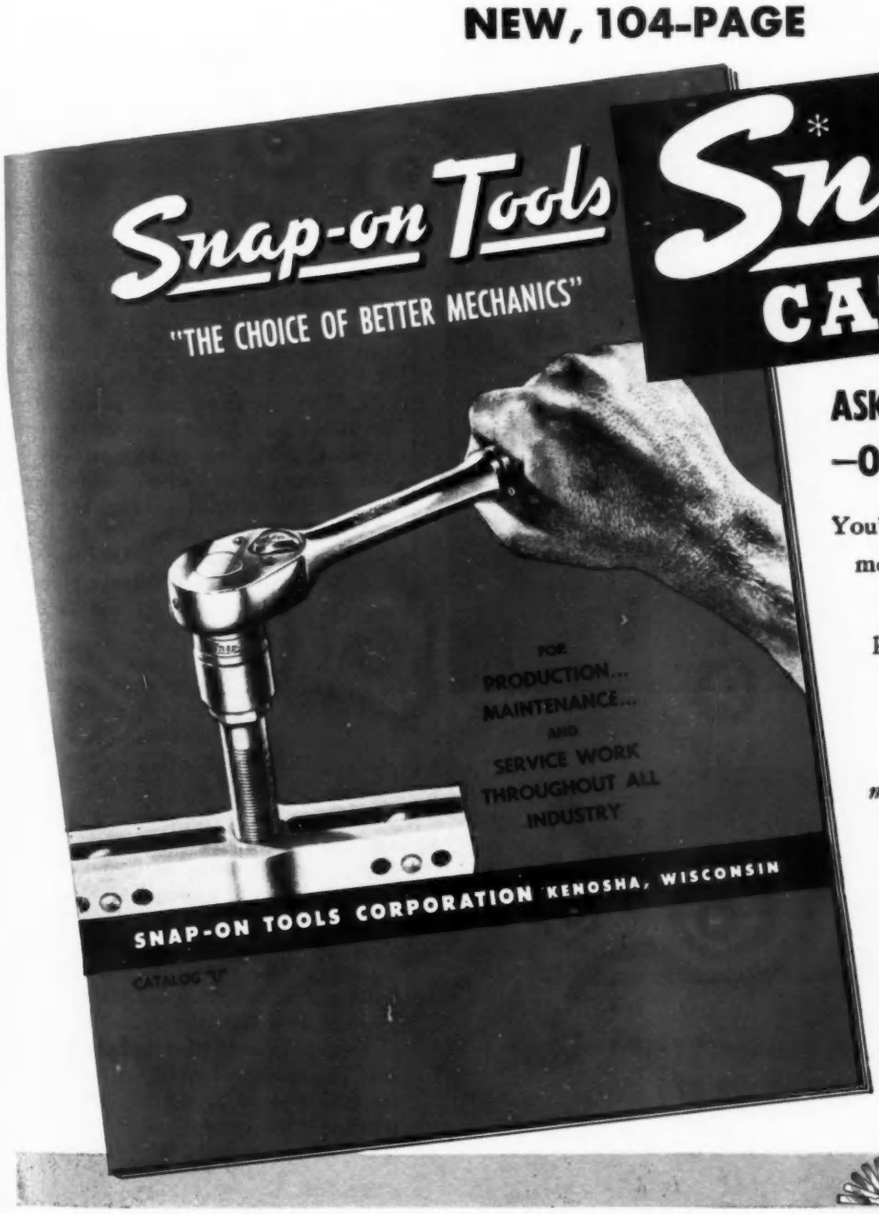
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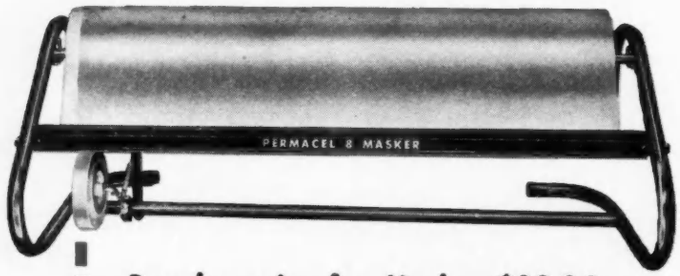

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Don't Spare the Rods

Continued from Page 106

of the cap. However, similar difficulties could have been caused by: filing of the cap parting faces, a wrong cap, cocking of the cap at assembly because of too much bolt hole clearance, dirt between the parting faces of cap and rod, and by defective bolts or bolt threads.

Give Your Rods A Chance

WHEN you dismantle the engine, you can make a preliminary check of the fit of the piston pin in the rod bushing. If it appears OK, remove the pistons from the rod assemblies, bolt the cap loosely to its respective rod and degrease the rod.

After cooling, bolt the rod cap in place, using a torque wrench to get the correct bolt tension. Check the rod as follows:

1. With an out-of-roundness indicator, or a pair of inside micrometers, check each rod big end bore for roundness. Check each side and if a variation of more than .002 in. is found, lay that rod to one side, as being unfit.

2. With the same inside micrometers or an internal gage, measure the rod bore. Check about one-quarter of an inch inward from the rod chamfer, in three places radially, and then the same way on the other side. Record these readings. If the average of all readings is larger than the correct maximum bore size, lay this rod to one side.

3. Check the used piston pin for signs of wear. Replace as necessary and check fit of new pin into the existing bushing that is in the eye end of the rod. Replace bushing as necessary and fit piston pin to it.

Check pin-fitted connecting rod in an alignment fixture for parallel and twist between piston pin and big end. If twist or out-of-parallel is more than .001 in 6 in., place this rod to one side.

4. Assemble new or reconditioned pistons to the rods that have passed the inspection up to this time. After assembly, recheck these for alignment in a suitable inspection fixture.

If you have performed the preceding inspection steps accurately, it is very possible that certain connecting rods have not met these standards.

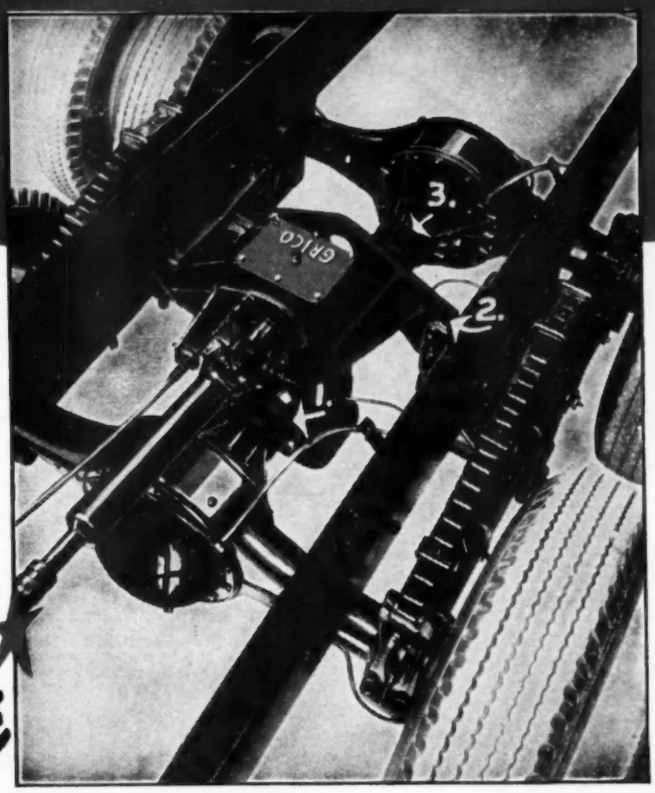
Those should be replaced either with connecting rods that have been reconditioned or with new ones. In all rods that passed inspection, new bolts and nuts should be used.

END

Please Resume Reading Page 72

GRICO TWO AXLE DRIVE

IN LINE WITH OUR PROGRESSIVE ENGINEERING, PROUDLY ANNOUNCES A NEW AND IMPROVED GRICO UNIT UNDER PATENT NO. 2,567,657.



IMPROVEMENT NO. 1

Improved adaptation of Transfer Case to front axle which allows free movement of Transfer Case and eliminates control of torque at this point.

IMPROVEMENT NO. 2

Cast alloy cross member having torsional arms with rubber pads to support Transfer Case.

IMPROVEMENT NO. 3

Enlarged and perfectly sealed telescopic torque housing.

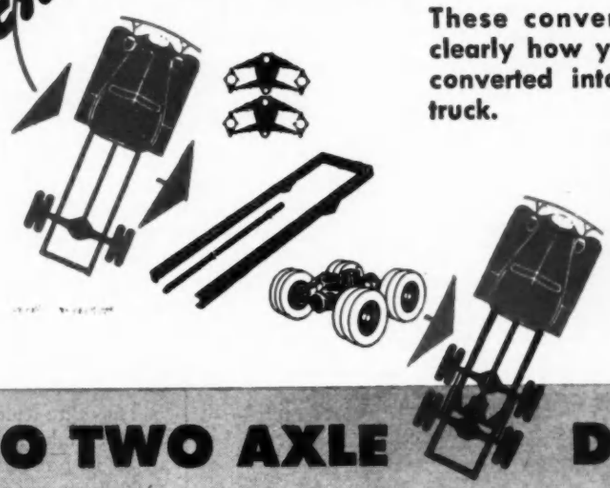
IMPROVEMENT NO. 4

Increased axle housing length and the latest design in hydraulic brakes.

HEAVY DUTY PERFORMANCE

from MEDIUM DUTY trucks . . .

These conventional drawings show clearly how your medium duty truck is converted into a heavy duty "profit" truck.



GRICO . . .
ALSO MANUFACTURES THE POPULAR SUPER-FLEX THIRD AXLE UNIT

GRICO TWO AXLE DRIVE Company
19840 W. EIGHT MILE ROAD
DETROIT 19, MICHIGAN

Air Springs for Tandems

Continued from Page 96

weighs over 300 lb less than the conventional steel spring suspension. Other features include improved road stability, improved tire life, safer braking action and reduced operating costs, according to General.

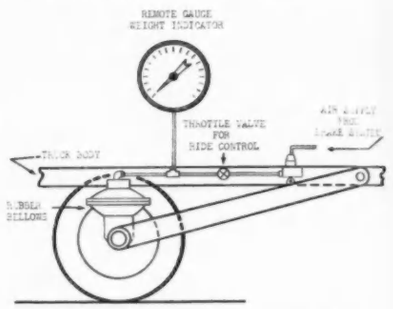
It is General's plan to produce only the air bellows unit itself with related rubber part, valves, etc. Assembly into complete suspension units will be left in the hands of normal producers of such products. CCJ has word that at least five independent manufacturers are now producing complete suspension systems using the new device. Others will undoubtedly follow.

END

Please Resume Reading Page 98

Air Suspension and Weight Gage Combination

A UNIQUE form of chassis suspension system intended for trucks, truck-trailers, and buses has been developed by Weber Instrument Co., division of Link Engineering Co., Detroit, Mich. Known as the Pnu-Ride Weighmaster System, it consists of an air cushion suspension combined with a means of weighing the load anywhere en route, using a remote weight indicator which can be installed in the cab of the vehicle.



This air suspension system, designed to take the place of conventional spring suspension, is said to cost less than conventional suspensions. Moreover, it has additional advantages of interest to the vehicle producer as well as the user. With air suspension vehicle height is maintained at a constant level regardless of improper or unbalanced loading, whether loaded or unloaded. Air pressure is employed to achieve this result, pressure being automatically increased to compensate for increases in loading. It is said to keep the vehicle on even keel, particularly on curves, and permits safer driving at higher speeds.

The special weighing system is incorporated as a part of the suspension, providing accurate weight readings for the benefit of the driver and warning when load limit has been reached, before leaving a loading dock. In addition, the gage enables the driver to know the exact weight of a heavy load such as a piece of machinery, for determining carrying charges.

The weighing system will assist in preventing unintentional overloading and, consequently, can eliminate the need for weighing stations with their attendant delays and penalties.

The Pnu-Ride system operates off the air brake line and requires only 20 to 50 lb pressure to support a load of 9000 lb on one air cushion. Almost any kind of commodity hauled over the road by vehicles equipped with air brakes may be loaded and unloaded by weight readings.

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Every item is backed by the AIRCO reputation . . . and delivered promptly to your door!

Whether you want to buy . . . or simply seek information, check your Airco dealer first! Consult your classified phone directory (under Welding Equipment and Supplies)...look for the famous sign.

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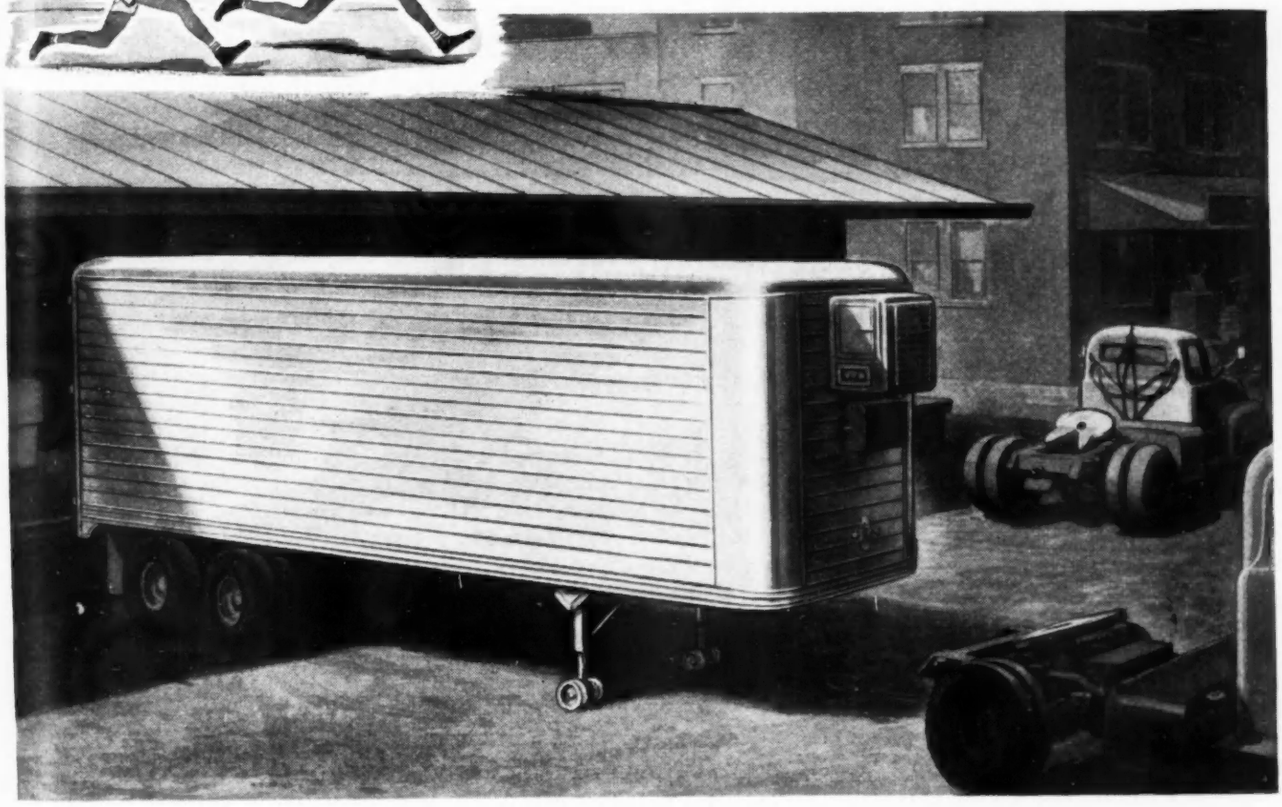
AN AIR REDUCTION PRODUCT

There's a new relay team on the American Scene



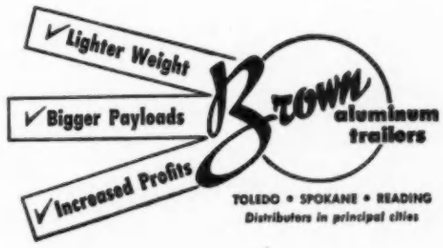
Coast to Coast Relay Trucking Service. Shippers are fast finding that the new motor carrier fast relay coast-to-coast service saves time and money. Trailers are switched from one tractor to another with little loss of time. There's no elaborate switching or routing procedure. Detach one tractor, hook on another, and the next leg is under way.

The modern coast-to-coast shipment in one trailer with cooperating freight lines relaying the trailer across is another step forward in the service rendered by the trucking industry.

It's service of this type that has brought 3 out of every 4 tons of freight shipped to the motor carriers.

Yes — whether it's for a short inter-city jaunt or a coast-to-coast run, the trend is to motor carriers.

And the trend is to Brown Aluminum Trailers to furnish this vital service. Brown Aluminum Trailers put the weight in the freight — reward the operator with a reasonable profit for the vital service he is rendering. And rendering a service so vital deserves the best—Brown Aluminum Trailers.



Propane Cabs Save 12% in Fuel...

Continued from Page 87

case dilution as with gasoline, and viscosity actually increases with use.

Engine lubrication is estimated to be about half that with a gasoline cab. Boynton finds it best to change oil every 2500 miles with a gasoline cab while propane cabs run 7500 miles in summer and 5000 miles in winter. In a recent test of 30 cabs under the same conditions, with ten on gasoline, ten on propane, 2127 quarts of oil were added to the gasoline cabs—1575 quarts to the gas-propane cabs but only 1016 quarts were added to the cabs which had always been on propane. To offset the increase in viscosity, this winter, No. 5 oil was tried, but it was so light that excessive quantities were used.

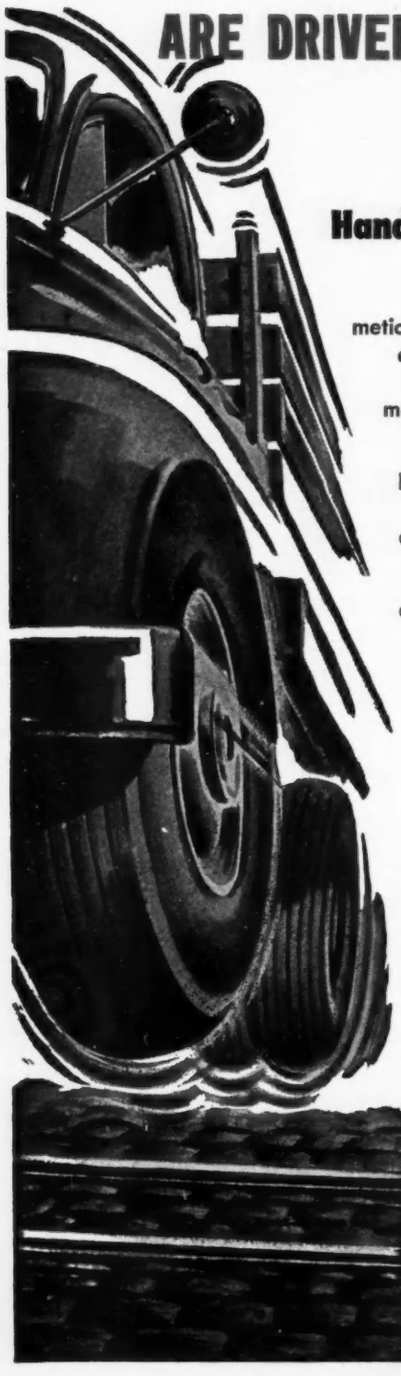
Boynton uses a light detergent oil and they find there isn't any wash down of piston walls as there is with gasoline and there is no trouble with sludge, dilution and dirt. They do not have any exact figures as to the comparative life on rings, pistons, bearings or valves. Spark plugs have a longer life and require less cleaning. All driving, of course, is city driving.

In fueling a propane cab, the pumping equipment is much the same as for gasoline as can be seen in the illustration. It is necessary to open the trunk for filling or looking at the fuel gage. Tanks are filled three quarters full so there is room for expansion with temperature changes. If a cab runs out of fuel, they find it more economical to tow it in rather than take fuel out because it happens so infrequently. A tank of propane will carry a cab as far as a tank of gasoline. It takes less time to add propane than it does gasoline.

As far as patrons are concerned, performance is the equal or better than with gasoline because the octane rating of propane is 120. And there are no vapor lock troubles in the spring. Limited trunk space is a disadvantage at times. Service calls are about the same as are insurance costs, tire costs and transmission and rear end troubles. The state road tax is the same as with gasoline.

END

Please Resume Reading Page 89



ARE DRIVERS "RAILROADING" YOUR VEHICLES?

Handy Governors Will Stop It

Any driver is likely to be less than meticulous in his care of a vehicle he doesn't own. Many feel no compunction about "railroading" your vehicles. Drivers do most of their work away from supervision . . . abuses are hard to correct.

Handy Governor will stop "railroading" —stop practices which run up costs and wear out vehicles before their time.

The savings in tire, fuel, and lubricant costs, engine repairs, brake maintenance and general maintenance are spectacular. Reduced accident and insurance costs are equally important.

Let us show you some figures on savings — and tell you how little it costs to get them.

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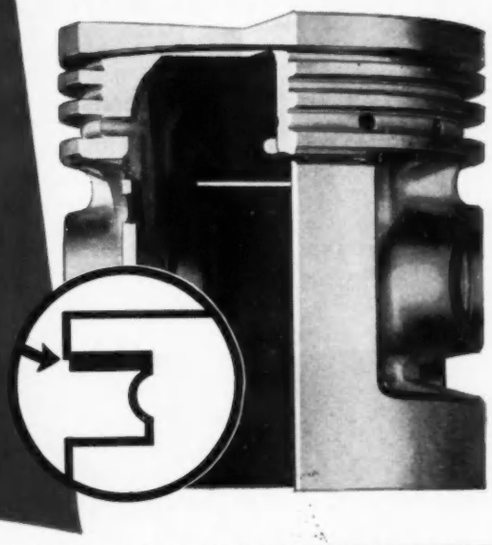
All Foam, No Beer

According to its U. S. Navy designers, anyone who can drive a jeep and pull a knob can spray gasoline fires with 1300 gal of smothering foam per minute for over two minutes without refilling. It will spread a protective cone of foam 30 ft in diameter over a trapped pilot and can reach a burning plane up to 90 ft away. For use on crash fires aboard larger aircraft carriers, it is mounted on a standard Willys-Overland jeep chassis and requires no other power supply than the regular 60 hp Willys engine.

Quick, easy insurance for piston and ring life!

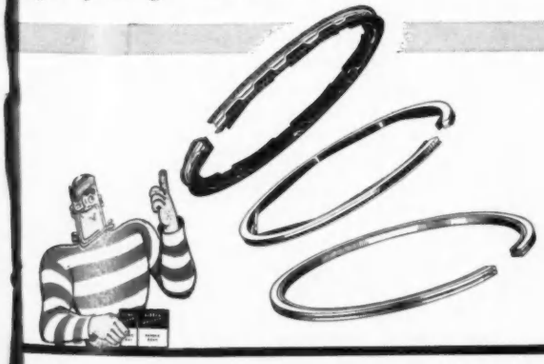
Hastings Steel-Lock Spacers stretch the life of both pistons and rings—fleet operators report thousands of extra, trouble-free miles. These high carbon steel bands lock into place in top groove, easily machined with special Hastings tool bit. The spacer absorbs most of the punishment and dissipates heat. Available through your Hastings jobber.



COMPLETE COVERAGE IN CHROME FOR DIESEL OR GAS

Ask for Hastings 2C Sets for re-ring, re-sleeve or re-bore. Each Set is *Motor Engineered* to the specific engine. Each incorporates the famous Steel-Vent Chrome oil ring. Companion rings are both regular and chrome, depending upon engine operating characteristics.

Ask for Hastings CT Sets if you prefer chrome top compression rings and cast iron oil rings—for re-bore and re-sleeve. Top compression rings are chrome-faced, others are cast iron. Oil rings are provided with or without inner-spring, depending upon engine.



Hastings considers each type piston and engine separately . . . develops and tests each ring under replacement conditions . . . engineers many special ring types for heavy-duty service. Hastings comes up with chrome top or oil or oil-compression rings to cover individual conditions.

Result: a Motor Engineered combination of the right rings for your engine, your operating characteristics, your replacement conditions. Specify Hastings Chrome on your next ring job—for more miles between overhauls, for top performance and economy.

HASTINGS

STEEL-VENT PISTON RINGS

Chrome Faced for Heavy-Duty Service

HASTINGS MANUFACTURING CO., HASTINGS, MICHIGAN; HASTINGS LTD., TORONTO - Piston Rings, Spark Plugs, Oil Filters, Combi-

Skill ± Attitude = Driver Performance

Continued from Page 65

principle. Those who benefit the most are rarely the winner, rather those who practiced, *improved*, but failed to become champions!

Another interest getting device is the practical demonstration. The detonator and the white chalk line on the road is a familiar device, but it is a sure fire way to *demonstrate* the number of feet it takes to make a stop at any given speed. Still another interest builder are the safety films which are getting better and better. Just recently there was an excellent list of them in COMMERCIAL CAR JOURNAL (March, page 70) and still others are on the way and winning "Oscars" in their field.

Next how can we make the training shorter? One very excellent way is to teach only the things that need to be taught. Recently the Army has rather basically changed its concept of the driver selection tests. By that I mean the whole gamut of tests especially the psycho-physical tests such as visual acuity, reaction time, depth and color perception, peripheral vision, etc.

Coupled with written examinations and actual driving tests (also by accidents, arrests and observed performance) we determine whether he is weak on turning, backing, parking, signalling, etc. Then by setting up specific classes of one hour each, for each of these categories, we can schedule the driver to attend only classes specifically related to his weakness. Of course, through it all we keep a careful watch for faulty attitudes, since the training is intended towards driver improvement.

Lempco's MOBILCRANE lifts, moves and places assemblies up to 2 tons under chassis and in recessed locations that overhead hoists cannot reach. Ideal for every loading, stacking and lifting problem.

No costly beams or overhead chain supports. The Mobilcrane can be moved anywhere within the shop. Spread of legs at base gives it an unusual stability on inclines or with swinging load, yet can be maneuvered easily by one man.

Safe! Pump, ram, valve and reservoir are housed in a single unit. No hoses or couplings to fail. No sudden uncontrolled dropping of load.

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Corrective Treatment

SECOND major category in the army's fight against VD is treatment. To the driver supervisor this means corrective measures to offset the causes. As hinted above this may be closely related to education, but a phase of training which should be separated from all forms of general education and should be aimed at the specific individual driver. In addition to using all manner of tests as a means of discovering individual weaknesses, detailed accident analysis should not be overlooked. We know of several of the larger fleets that are analyzing their accidents in great detail. One fleet for instance has a category of accidents resulting from "vehicle overtaking and passing." Under this heading are such minor ramifications as these:

Vehicle cut-in in front.
Vehicle cut-in along side.
Vehicle caught by overhang.
Vehicle pulling in to stop.
Vehicle pulling away from stop.
Vehicle turning right.
Vehicle turning left.
Vehicle struck by door of another vehicle.

This list, of course, can be expanded indefinitely and we understand that COMMERCIAL CAR JOURNAL now has a whole article in the works on this phase of accident reduction.

But the point to remember is that this type of detailed accident analysis is designed to determine what our driver did wrong. Once that fact is determined, it is up to the supervisor to make the driver understand what he did wrong and take the necessary steps through demonstration, individual practice, and good common sense reasoning to prevent him from making this same

(TURN TO PAGE 117, PLEASE)

. . . Driver Performance

Continued from Page 114

error. Other corrective treatment may deal with spectacles to offset weak vision, or even improved maintenance to insure better performance—the vehicle's brakes, etc. In any event, make the "medicine fit the ailment."

Improved Safeguards

THE fleets' accident prevention safeguards are myriad and invariably would include the major categories of driver selection and training. In addition it would include such additional fleet operator's activities as road safety patrols and improved relationship and cooperation with police agencies—all with the objective of better enforcement of rules and regulations.

On the advantages of these points there is so much unanimity of thinking that I do not think it is necessary to dwell on them except for one phase of selection, often overlooked but growing rapidly in importance. This is the problem of sociological background. What about family relationships, credit standings, maladjustments, general responsibility of the individual, etc.? A great many studies have been made recently by such eminent authorities as New York University, University of Toronto, Northwestern University, North Carolina State College, and Harvard University—all with the same idea of probing into the relationship of the seemingly unrelated background characteristics to accidents themselves. Everyone of them has proved that they have far greater bearing on the subject than is generally recognized. Virtually all of the studies have been executed by segregating a group of accident repeaters on the one hand and of accident free-drivers on the other. From the studies there is much evidence to indicate that the sociological background is even more important to ultimate driver performace than are the actual physical skills. They certainly relate to the all-important subject of attitude. They suggest that accidents may be the natural consequence of certain behavior patterns, these patterns can be detected—and often they can be improved.

Incentives

ONCE you have satisfied yourself that your original selection has been made on the right grounds and that your driver training program is complete, then you still have the problem of maintaining morale throughout the entire period that the man is in your employ. Picture yourself as one of your own best drivers. You have a completely accident free record. You are conscientious in all of your duties and you do your job well. Then ask yourself "what is there in it for me?" All too often there is nothing and so the morale or the attitude of the driver begins to drop. Eventually an accident is born. Give a man reasons to drive safely, make sure he knows them, and reward his improvement.

Incentive, of course, can be presented in a wide variety of ways, and they include an annual recognition dinner, safe driving pins, certificates, merchandizing awards, or cash. It is not for us here to decide what are the best incentives, but rather to satisfy ourselves that we do offer incentives. Whether your company gives away a $20,000 house to its best (and luckiest) driver, or whether it gives a percentage of pay, or whether it is an annual certificate of appreciation it matters little. It is the effect of the incentive which can be earned that counts. Are you using it effectively to keep morale high in your organization?

(TURN TO PAGE 118, PLEASE)

DOUBLE usefulness... DOUBLE carrying space...

MORRISON Carry-All SERVICE BODIES

• Carry-All Model B-750 for ½ ton chassis, equipped with Material Trays in horizontal compartment. 32 cubic feet of added carrying space in 6 compartments. 25 square feet of floor space. Can be fully enclosed with Carry-All Caravan Top or Carry-All Sliding Roof.

A GOOD LOOK at Morrison Carry-All Service Bodies and Carry-All Efficiency Equipment will convince any operator that here is a way to make his light truck investment pay off bigger and quicker. Why be handicapped by the *use* and *space* limitations of conventional-type service truck bodies?

CARRY-ALL SERVICE BODIES are designed for use on *all makes* of ½, ¾ and 1 ton chassis. Easily mounted on old or new chassis. Easily transferred from one chassis to another. *Carry-All Efficiency Equipment* will further "custom" tailor your light trucks to the specific needs of your business.

CARRY-ALL SERVICE BODIES offer many exclusive features in design, construction and adaptability. Public utilities and service industries everywhere have proven Carry-All efficiency and economy of ownership.

To know what Morrison Carry-All Bodies and Equipment can contribute to your service truck usefulness write today for prices, detailed specifications and complete illustrated literature. No obligation.

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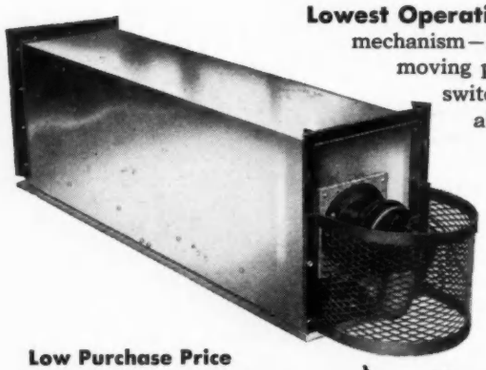
J. F. Hill, Production Mgr.
PictSweet Foods, Inc., Mount Vernon, Washington

"CUT DRY ICE CONSUMPTION ⅓

WITH FOSTER-BUILT DRY ICE BUNKERS"



Lowest Operating Cost. No complicated mechanism—a low amp fan is the only moving part. Just load the bunker, switch on the fan, and chilling air is immediately circulated throughout the truck—for quick, effective load refrigeration.

Low Purchase Price

Foster-Built Dry Ice Bunkers are the lowest cost way to effective truck refrigeration for both over-the-road haulers such as PictSweet's modern trailer and for many-stop city delivery trucks.

Easy to Install —Lighter in Weight

Placement of 4 studs and a quick wiring operation and they're ready. Can be removed in minutes, too, when refrigeration isn't needed. Foster-Built Bunkers weigh only a fraction of cumbersome mechanical units . . . less weight — more pay load.

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☐ Dry Ice Warehouse List

Name.....
Company.....
Address.....
City..... Zone..... State.....

. . . Driver Performance

Continued from Page 117

Discipline

FOURTH on the list of the Army's VD program is discipline. Whether we are discussing VD or Vehicle Accidents, it should be definitely a last resort. When it is necessary one major rule is very important. Here it is: *The certainty of punishment is much more important than the severity.* If a group of drivers is "getting by" with known violations and all of a sudden one of them gets the book thrown at him, it invariably causes bad morale throughout the whole organization.

But if even a minor penalty is imposed with absolute regularity for *every* violation, drivers soon learn that it is the expected rather than the unusual result of their errors and that it is being imposed fairly throughout the organization. As a result morale almost invariably is higher. Time and time again comparisons of Army motor pool operations have proved this point. Adopting a "standard table of penalties" serves to guide management in this respect, and should indicate the minimum or maximum penalty range for each type of violation.

Leadership

AND that brings us down to the last point—making the commander responsible. Many a fleet driver knows *how* to drive, he knows about awards and he knows of the penalties. He is physically fit and very able. Yet he says: "To hell with it—all this stuff is for the birds." It is an old familiar tune. The answer and the only answer is better *leadership.* And the key to better leadership is the ability to inspire in drivers a better attitude. Being a better leader is a tough job.

Set out to learn how well your drivers actually drive, not how well they *can* drive. Try to prevent rather than blame. Try to teach, not to criticize. Try to foresee, not to excuse. Try to improve before replacing. No one intends to have an accident but still they occur, and most of them can be attributed to supervisory failure—failure to convincingly teach, prove, demonstrate, and induce. Teaching and measuring actual driving skills is perhaps the easiest job of all. Instilling proper attitude is the toughest, but the most important, since it is the stuff of which driver improvement is made. And most drivers are more easily improved than replaced.

END

Please Resume Reading Page 66

NEW GENERAL RIB HIGHWAY TIRE

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Analyze and Correct Bearing Failures

Continued from Page 81

perature plays a very important part in determining bearing life. For example, the life of a tin base babbitt bearing is approximately doubled by reducing the bearing back temperatures from 280 deg. to 250 deg. F. Since bearing cooling is accomplished mainly through oil flow, attention is constantly directed toward maintaining the flow at a practical maximum. Analysis of fatigue failures should always include an investigation of operating temperatures, particularly if the running surface shows evidence of heat such as lead sweat, melting of the babbit, or dark discoloration. Abnormally high temperatures may be the result of scoring by foreign particles, excessive friction and inadequate cooling elsewhere in the engine, or a restriction of the oil flow, as through inadequate clearance.

Wiping and Seizure

WITH heavy-duty bearing materials such as copper-lead, leaded bronze, silver, and aluminum base alloys replacing micro babbitts, fatigue is being rivaled by surface wiping and seizure as the most common type of bearing failure. In general, strength is gained only at the sacrifice of softness and surface conformability. Besides being stronger, heavy-duty bearing materials are harder, less embeddable, possess a higher modulus of elasticity and have a higher melting point than the babbits. For these reasons the stronger materials usually require a thin overlay of a soft, conformable, low-melting material to accommodate any off-conditions that may otherwise lead to a surface failure. This overlay, which may be a tin or lead base babbitt about 0.01 in. thick, has greatly reduced but not entirely eliminated the wiping type of failure.

Surface wiping and seizure result from off-conditions that bring about a localized breakdown of the oil film. The inability of harder alloys to "heal over" once they encounter metal-to-metal contact accounts for seizures under conditions where a babbitt bearing would survive.

Off-conditions most likely to initiate film breakdown are:

1. Hard foreign material carried by the lubricant.
2. Misalignment between the shaft and bearing.
3. Roughness of the shaft.
4. Low clearance.
5. Failure or restriction of the oil supply.

The major cause of surface failures in heavy-duty bearings is dirt. Much of the foreign matter found in lubricating systems is of a size larger than the combined thicknesses of the oil film and soft bearing overlay and in many instances is even thicker than the diametral clearance. When such a particle is discharged into the center of the bearing and is not embedded because of the hardness of the lining, one or a combination of the following must result:

1. Scoring of the bearing surface.
2. Scoring of the shaft.
3. Breaking up of the particle, into pieces small enough to be flushed through the clearance area.

Regardless of the cause, instantaneous surface heating occurs. Since the top temperature of this heating is the melting point of the lining,

(TURN TO PAGE 122, PLEASE)

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New National GARAGE TOOLS Tube Cutter
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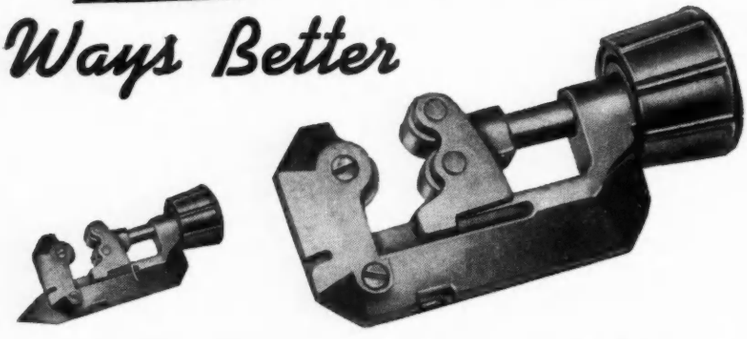

1. Pressure rollers operate on a sliding feed mechanism — they feed evenly and easily — are always in perfect alignment. Stop on slide prevents damage to cutter blade.
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4. Big, easy-to-grasp knob is mounted on ball bearings — spins rollers down to perfect alignment on tube easily and quickly.
5. Reamer knife is retractable — protects both the knife and your hands, yet is instantly available for reaming. Locks solidly in open position.
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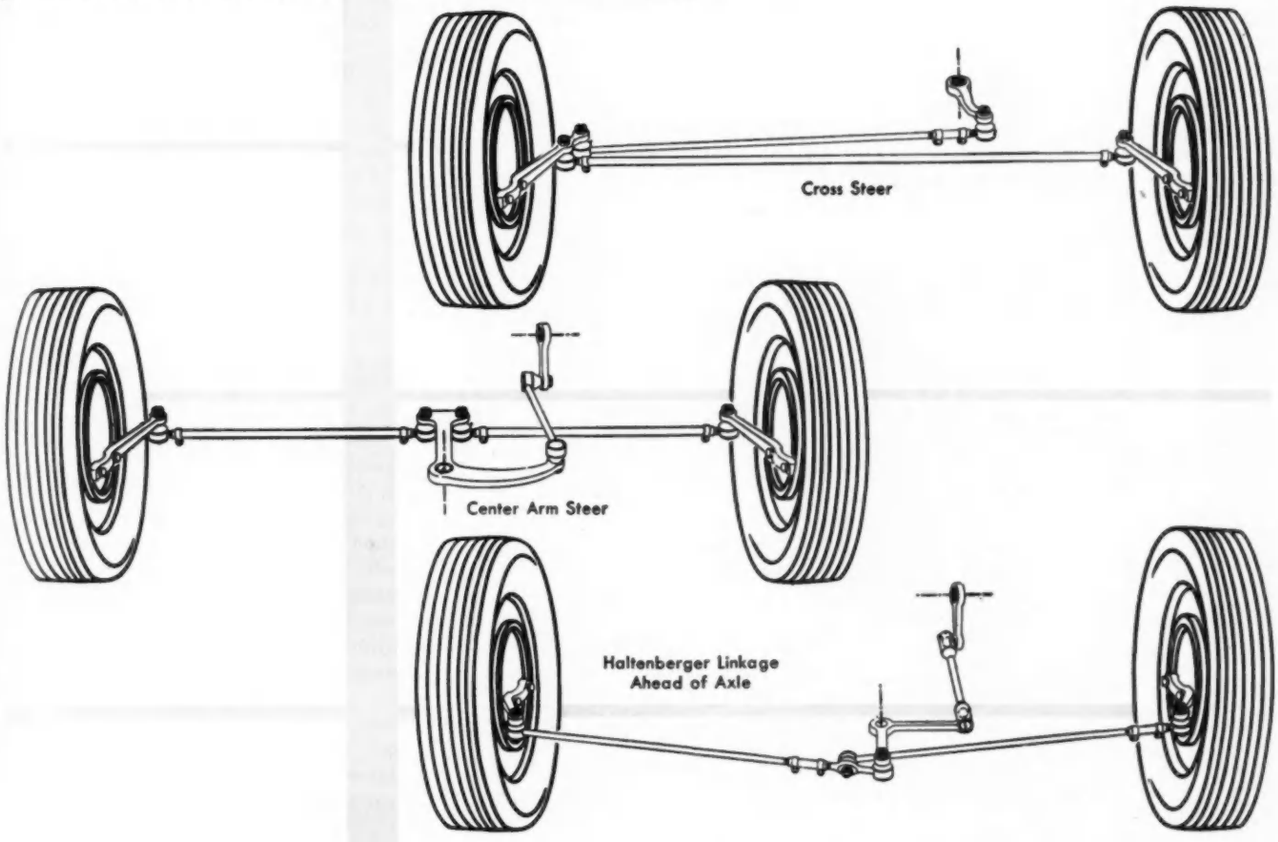
Engineered Steering for Passenger Cars



STEERING LINKAGE must be developed to meet the requirements of many different car designers. Thompson's "Steering Engineers" have worked closely with car builders for over 35 years to improve steering—to make it safer, easier and more economical.

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Improvements on modern automobiles—reduction of space due to front wheel brakes—re-distribution of car weight by relocation of engines—increased movement of front wheels due to more efficient suspension and precise location of linkage parts with relation to high point on the gear—necessitated better and far more complicated steering units.

Illustrated are 3 of the types of steering linkage found on current-model automobiles. The Detroit Division of Thompson Products has many other variations of steering units designed for passenger cars as well as for trucks and tractors. We welcome the opportunity of submitting them for your examination. Please contact us.

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Thompson Products, Inc.

DETROIT DIVISION

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Analyze Bearing Failures

Continued from Page 120

much higher temperatures are possible with copper, silver, and aluminum base materials than with tin or lead base babbitt.

To illustrate the tremendous amount of heat that may be absorbed by a single bearing during a seizure, consider a shaft operating at 1875 rpm and developing 90 hp. The kinetic energy of the moving parts and the energy developed by the engine horsepower during the period of seizure are dissipated into a single bearing. This energy amounts to a BTU value many times the potential energy of an acetylene torch operated over the same period of time. For an instant, therefore, a steep temperature gradient exists between the ID and the OD of the bearing.

Another occasional by-product of the surface wiping type of failure is the rupturing of the bond between the lining and the steel back. Subsequent breakout of the lining has the appearance of a fatigue failure but is actually the result of bond failure through heat subjugation.

Too often a seized or wiped bearing is mutilated to the extent that all evidence of the cause of the original film breakdown has been destroyed. The analysis must then be directed toward the installation where the following items are investigated:

1. Engine cleanliness.
2. Main bearing bore, rod bore and shaft alignment.
3. Bore distortion study.
4. Engine lubrication study.
5. Clearances.
6. Shaft surface finish.

Experience has shown that engine cleanliness is the most important factor in combatting surface failures. This is particularly true when heavy-duty bearings are used in the replacement field following an overhaul or in areas where dirt and dust particles from the air are apt to contaminate the lubricating system as in mining, earth-moving, or desert operations.

The lubrication study is made from lubrication formulae and is conducted to guarantee that sufficient oil is being supplied to the bearing. The calculation takes into account bearing clearance, the viscosity, pressure, and temperature of the oil, hole and groove design, bearing load, and shaft speed. Although greater flow and cooling is expected with lower viscosity oils, the film thickness is reduced. This may increase the amount of surface scoring and be instrumental in developing higher surface temperatures and surface wiping.

Corrosion

CORROSION, which is confined largely to copper-lead and cadmium alloy bearings, is visually differentiated from fatigue by appearing generally over the entire bearing surface, even in the unloaded zones. At times fatigue and corrosion occur together in the same bearing. When lead is removed from between the copper dendrites, the structure is weakened and will collapse under load and break out in a typical fatigue fashion.

A laboratory analysis is usually necessary to definitely identify corrosion. For example, it is sometimes difficult to distinguish between loss of lead through corrosion and loss through high temperature lead sweat. In such cases it is necessary to prepare a metallographic specimen of the failed portion of the bearing and study the copper-lead structure. If there is a general deleading of the bearing surface, either corrosion or lead sweat has

(TURN TO PAGE 124, PLEASE)

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Analyze Bearing Failures

Continued from Page 122

occurred. If the sides of the copper dendrites in this area are completely devoid of lead, the bearing has corroded. Lead sweat, which results from a melting out of the surface lead because of an oil film failure, always leaves a thin film of lead adhering to the copper dendrites.

A second and less accurate form of metallographic corrosion analysis is the fracture test, which consists of sharply reverse bending a copper-lead bearing and observing the color of the exposed lining fracture. A gray fracture denotes adequate lead and a red fracture is suggestive of lead corrosion.

A third check for corrosion can be obtained from an analysis of the oil. This includes such items as appearance, neutralization number, copper, lead, iron, sulfur and ash content, and the identification of filterable solids. Any metal attacked by the lubricant will have gone into solution and can be chemically identified by precipitating out as part of a soap. Too often, however, a sample of the oil from a field failure is not saved and a valuable analysis tool is lost.

Corrosion in copper-lead increases rapidly with the coarseness of the structure, the lead content, oil oxidation, detergency and acidity, and high operating temperatures. There have also been instances where corrosion resulted from operation at engine temperatures below 210°F. It is generally recognized that copper-lead corrosion is minimized when the oxidation or corrosion inhibiters plate out or form a protective film on the active metal surfaces. However, since this reaction is somewhat controlled by engine operating temperatures, the films will not form if the temperature is too low. When corrosion of copper-lead occurs under conditions which do not indicate high temperatures or oil deterioration, the presence of moisture, blow-by, and general operating conditions of the engine can either contribute to or be a direct cause of bearing corrosion.

A 0.001 in. thick protective lead base overlay, which, as previously pointed out, increases the fatigue strength and reduces the surface sensitivity of heavy-duty bearings, performs a third valuable function in improving the corrosion resistance of copper-lead or leaded bronze bearings. Unless this overlay is worn off or deeply scored, there is little chance of corrosion occurring in practically all present-day applications. There have been instances, however, where, after scoring had exposed the copper-lead, corrosion penetrated deeply into the intermediate layer and also progressed laterally beneath the overlay.

Lead base babbitts corrode at a much slower rate than the free, uncombined lead in a copper-lead mixture. If conditions are excessively corrosive, however, a lead alloy will be attacked leaving a rough, pitted surface, which has a scalloped contour when viewed in cross-section under a microscope. Corrosion has never been a problem in tin or aluminum base alloys.

Fretting is a special type of corrosion that is typified by localized discoloration and minute surface pitting. It may be found on either the bearing or shaft member and is attributed to high vibratory loads between two mating surfaces having very slight relative motion. It is found in heavy-duty bushing applications involving heavy loads and only slight oscillatory motion, as in piston pins and steering knuckles. It also occurs on the backs of bearings that fit loosely in their

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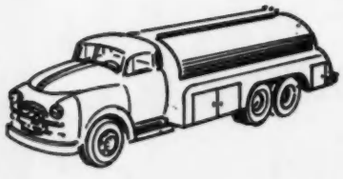
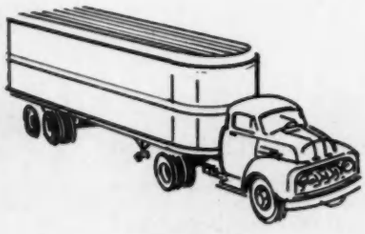
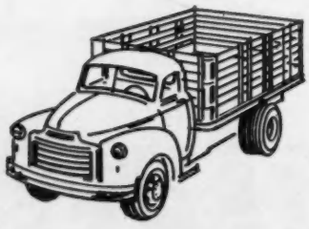
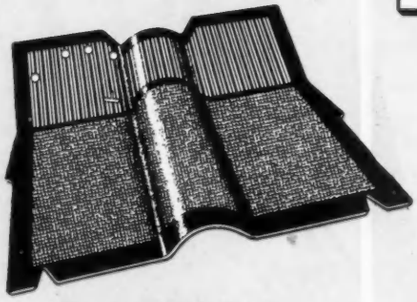

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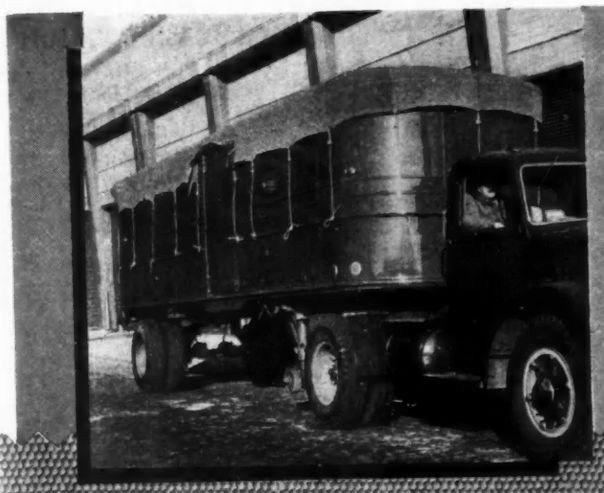

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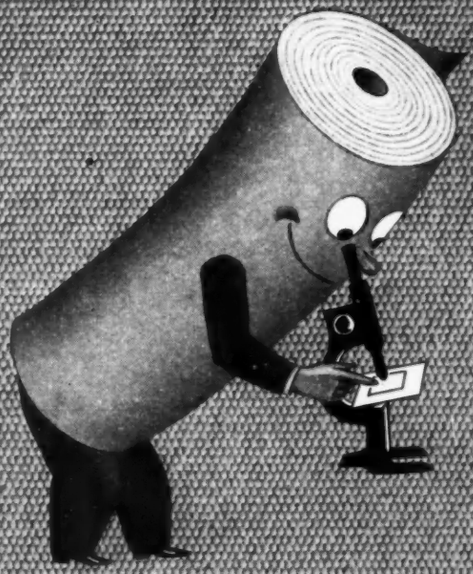

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Analyze Bearing Failures

Continued from Page 124

housings. In this case it is reduced by increasing the press fit so that the motion between the back of the bearing and the housing bore is reduced to a minimum.

Erosion

EROSION is of two varieties. One type is recognized by the removal of material previously weakened through fatigue or corrosion. Breakout occurs in nearly straight lines which follows the direction of oil flow.

The second and less understood type of erosion is cavitation. It is usually found in high speed applications and seldom in the automotive or diesel fields. Rarely is it associated with other types of failure. Cavitation is a localized phenomenon, occurring under special conditions of load, shaft speed, groove design, and vibration. It is identified by a pitted surface and usually assumes a typical erosion pattern. It is not confined to bearing surfaces alone but is also experienced on other engine parts, including the steel running surfaces of high speed shafts. Correction of this condition, or at least a lessening of it, is sometimes possible by the application of flats to the journal, axial grooves in the bushing or bearing surfaces, changes in lubricant flow, changes in the lubricant entry location, if in a gear bushing, altering tooth profile for smoother gear operation.

Wear, Abrasion and Scoring

IN CONCLUSION, the surface of a used bearing reflects the cleanliness of its engine. A large amount of foreign matter embedded in a soft babbitt lining the scoring of a heavy-duty bearing, or an appreciable amount of shaft wear are indicative of excessive engine dirt. This represents the most serious cause of bearing failure today. In addition to wearing and abrading the bearing, foreign particles lead to high operating temperatures, lower fatigue life, interrupted oil film, wiping and seizure.

END

Please Resume Reading Page 82

CCJ

First Truck Mechanic: "Gosh a-mighty, Buster, that was really some swell looking dame I saw you with last night. You must have had to give her a wonderful present to get her to date you!"

Second Truck Mechanic: "No—there was no present involved. But I did give her a wonderful past."

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An all-new Hein-Werner 4 ton hydraulic service jack

Here's the answer to the mechanic's demand for a hydraulic service jack that would handle all cars and light trucks, and yet be easy to handle and easy to use. Just a look at a few of the important construction features of the advanced design G. G. will tell you why:

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For further details, see your H-W jobber or write us.

THE COMPLETE HEIN-WERNER LINE OF HYDRAULIC JACKS INCLUDES: Under-Axle Jacks of 1½ to 100 tons capacity . . . "Bumper-Lift" Jacks for passenger cars . . . "Swift-Lift" and Service Jacks for shop use . . . Adjustable Car Stands . . . "Push and Pull" and "Pushmaster" Jacks for body, fender, and frame work.

Hein-Werner HYDRAULIC JACKS

HEIN-WERNER CORPORATION
Waukesha, Wisconsin

Condition Maintenance Extends Parts Life

Continued from Page 68

when the garage foreman feels that the rebuilt unit coming from the central shop is not up to the established standards. In this way close control over maintenance levels is maintained.

Here is an example of how we can check abuses before they cost too much. Suppose that transmission assembly comes into the central shop, indicating by its wear that had it been removed just a little sooner, certain gears and shafts could have been salvaged for reuse. This is the responsibility of the inspectors. They find these conditions, make recommendations and thereby arrive at more realistic overhaul figures than we ever reached before. Only with a continuous check of practice, however, can you control such practices.

Assistant Supervisor of Garages

A KEY man in correlating the efforts of each individual is our assistant supervisor of garages. This man is a practical engineer. He spends a considerable part of his time in studying procedures, in observing maintenance routines and in developing time and labor-saving practices that will become standard maintenance practice. Our Assistant Supervisor of Garages travels from garage to garage, watching, questioning mechanics, studying and discussing conditions, as he estimates the life of parts, how to extend that life, whether a substitute part won't do more efficiently at less cost, whether a special tool won't be more effective, when to anticipate failure of parts, and a number of other duties. Among the great number of time-, labor- and money-saving changes he has introduced, we can cite here a few:

Observing that automatic shifting controls on buses with automatic transmissions were giving trouble, he was aware of the need to simplify the operation of controls. Working with our bus maintenance instructor, he was largely responsible for reducing the number of wires used by ½, and eliminating the very troublesome relay. The unit was simplified to the point where service calls dropped off 75 per cent and inestimable dollars and hours in trouble-shooting saved.

We used to lose a lot of time removing brake drums that were to be sent to the central maintenance shop for machining. A portable brake drum lathe which would permit leaving the brake drum on the hub was suggested by our assistant supervisor and tried out for one year at one garage. Pulling the wheel off but leaving the brake drum on the hub undisturbed, we now save untold hours of labor avoiding

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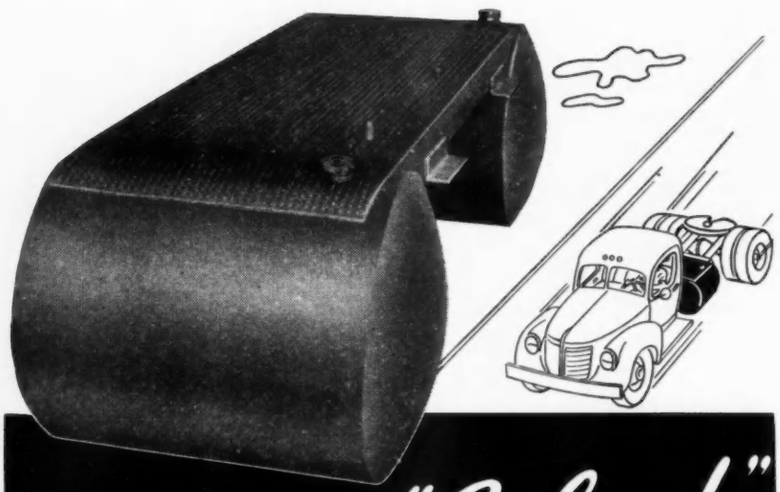

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New Cylsad models are an average of 50 lbs. lighter, equipped with dual fill-neck arrangements and simple, proven venting facilities. Construction conforms with I.C.C. regulations. Like all Lintern tanks, the Cylsad is subjected to periodic inspection by Underwriters Laboratories, Inc. Lintern inspectors use Freon Gas and the famous G. E. Electronic Leak Detector plus other rigid inspection methods.

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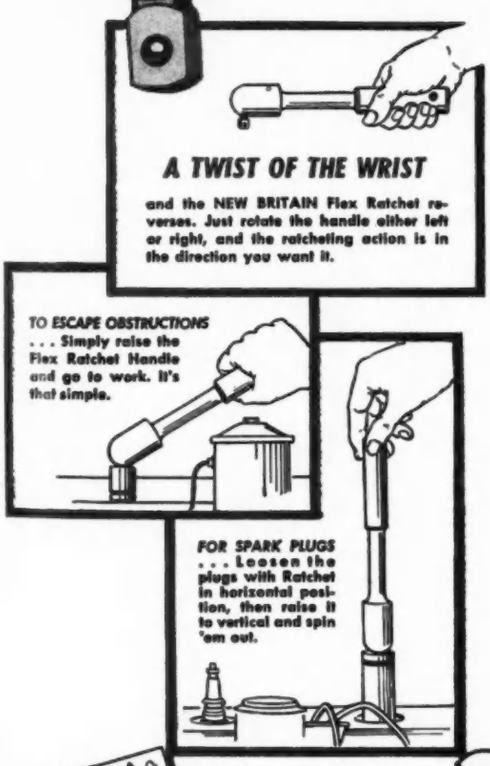
Here's a Tool, only 7" long, compact enough to fit into close quarters, yet long and powerful enough for adequate leverage. Modern head design eliminates overhang, whether at right angle position or tilted to escape obstructions. Especially useful in easy access to differential drain plugs. In fact, there are scores of places under the hood on modern cars and trucks where it offers the only quick and really practical means of getting at and around obstructions to many accessories and parts. Ask your Jobber about this great new Ratchet today.


A TWIST OF THE WRIST
and the NEW BRITAIN Flex Ratchet reverses. Just rotate the handle either left or right, and the ratcheting action is in the direction you want it.
TO ESCAPE OBSTRUCTIONS . . . Simply raise the Flex Ratchet Handle and go to work. It's that simple.
FOR SPARK PLUGS . . . Loosen the plugs with Ratchet in horizontal position, then raise it to vertical and spin 'em out.

NAPA Assurance of Quality

New Britain HAND TOOLS

GREATER STRENGTH • BETTER FIT

THE NEW BRITAIN MACHINE CO. • NEW BRITAIN, CONN.

Condition Maintenance . . .

Continued from Page 128

removing heavy brake drums. The machine is aligned with the bearing cups of the hub serving as centers from which to work in the machining process.

We have extended the life of our brake drums to the point where we expect 350,000 miles out of our rear brake drums. Under our old procedure we used to replace them after two machinings which reduced them in successive machine processings of 1/8 in. We do not know as yet how many miles we shall be able to get out of our front brake drums since some buses at 300,000 miles have not yet reached first oversize. Front brake drums on buses bought in '49 that have completed 200,000 miles are just now reaching first oversize.

We found an unusual amount of wear within a short period on the winterfront or shutter used to control engine water temperature on our newer buses. The wear was greatly in excess of any shutters on our old buses. Adapting the old system to the new bus, we saved considerable money.

Thoroughly acquainted with parts as he constantly watches stock, the assistant supervisor of garages often furnishes substitutions right from stock of parts difficult to get, as a similar bearing from one type of bus that will fit another. He is constantly alert to the oversight of parts that may have been duplicated or erroneously binned. Knowing when parts will start failing, he anticipates stock withdrawals.

The head inspection mechanic may call to his attention an unusual accumulation of carbon in compressor heads of a certain type of bus in his garage. The assistant supervisor may have the inspection plug of the air compressor head checked in a number of buses at other garages and watch the entire fleet of that type of bus for a hazardous condition of carbon buildup. As a result of his findings, he may contact head inspection mechanics at all garages through their respective foremen and ask them to change air compressor heads.

Bus Maintenance Instructor

AN institution at Capital Transit may be unique for bus operators. We retain a bus maintenance instructor who holds schools for garage personnel in maintenance practice that needs reviewing, as evidence from road call sheets indicates. Because of the complexity of the operation of a unit, or the infrequency of troubleshooting it, classes in that unit are called for two hours a day, twice a week, with length of courses depending on how fast the subject can be assimilated.

One such school is on our treadle operated doors. It was the instructor's job to gather all information on doors, electrical and mechanical, and build a working model to be used for demonstration in the classroom. Mechanics from each shift in each garage responsible for door repair attended the classes in how to troubleshoot, adjust, repair or replace all of the mechani-

[TURN TO PAGE 132, PLEASE]

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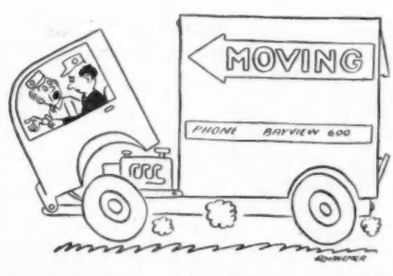
Doing an All-Star Job Since 1920

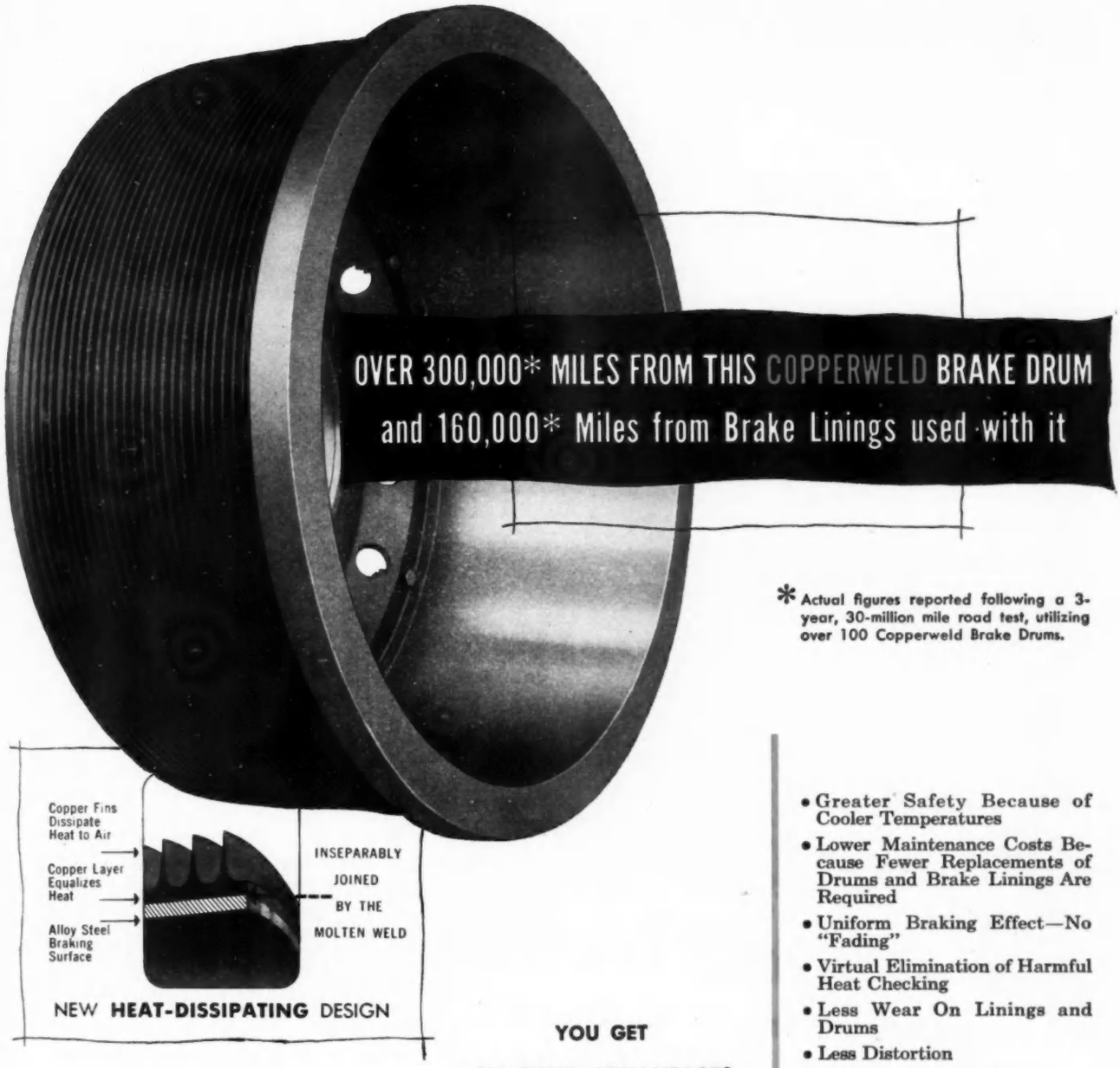
DEALERS: Compare the Biederman National Standard Model with any truck on the market and you will agree that it is an All-Star team in itself.
Only the most sturdily constructed units of America's leading manufacturers are built into it.
Biederman Trucks win by performance. Inquiries regarding dealerships solicited.

WRITE, WIRE or PHONE

BIEDERMAN MOTORS CORPORATION
CINCINNATI 14, OHIO



"I wish we'd come to the end of this hill!"



OVER 300,000* MILES FROM THIS COPPERWELD BRAKE DRUM and 160,000* Miles from Brake Linings used with it

* Actual figures reported following a 3-year, 30-million mile road test, utilizing over 100 Copperweld Brake Drums.

Copper Fins Dissipate Heat to Air
Copper Layer Equalizes Heat
Alloy Steel Braking Surface
INSEPARABLY JOINED BY THE MOLTEN WELD

NEW **HEAT-DISSIPATING** DESIGN

- Greater Safety Because of Cooler Temperatures
- Lower Maintenance Costs Because Fewer Replacements of Drums and Brake Linings Are Required
- Uniform Braking Effect—No "Fading"
- Virtual Elimination of Harmful Heat Checking
- Less Wear On Linings and Drums
- Less Distortion
- No "Bell-Mouthing"
- Reduced Temperatures on Brake Parts, Wheel Bearings, Tire Beads, Lubricants and Running Gear
- Longer Service Life
- Greater Operating Economy

YOU GET ALL THESE ADVANTAGES with

Copperweld

TRADE MARK

BRAKE DRUMS

Made By The Exclusive Copperweld MOLTEN-WELDING Process

Want More Facts and Operating Data? **WRITE DEPT. C**

BRAKE DRUM DIVISION

COPPERWELD STEEL COMPANY

Glassport, Pa.

OTHER DIVISIONS: WIRE AND CABLE, Glassport, Pa. • FLEXO WIRE, Oswego, N.Y.; ARISTOLOY STEEL, Warren, Ohio

Copperweld Products Are Serving Many Industries—
And Have Been Doing So Dependably And Economically
For Over *38 Years*

Condition Maintenance . . .

Continued from Page 130

cal, electrical and air operated controls of the door system as well as the doors themselves. But most important, every man was required to learn by heart, the complicated electrical circuits of the treadle operated door system as we use it.

Another school was given on alternators. The bus maintenance instructor spent a couple of days with a mechanic from each garage on alternators. Another school was held in automatic shifting controls on automatic transmissions when it became evident mechanics were having trouble understanding this highly complex control system.

Gathering all possible information from both shop and supplier sources, the instructor prepares a book including charts and diagrams explaining how and why of the subject matter, and this book supplements the course aiding the mechanics in the final examination.

While the bus maintenance instructor's job includes writing the standard practice bulletins and Bus Maintenance Guide, his is *not* a paperwork job. Circulating through the garages, investigating, questioning and studying mechanics practices, he ultimately contributes to the constantly changing approaches and methods for greater efficiency. Paperwork is one of his means of disseminating information and changing developments to our mechanics.

The Driver's Responsibility

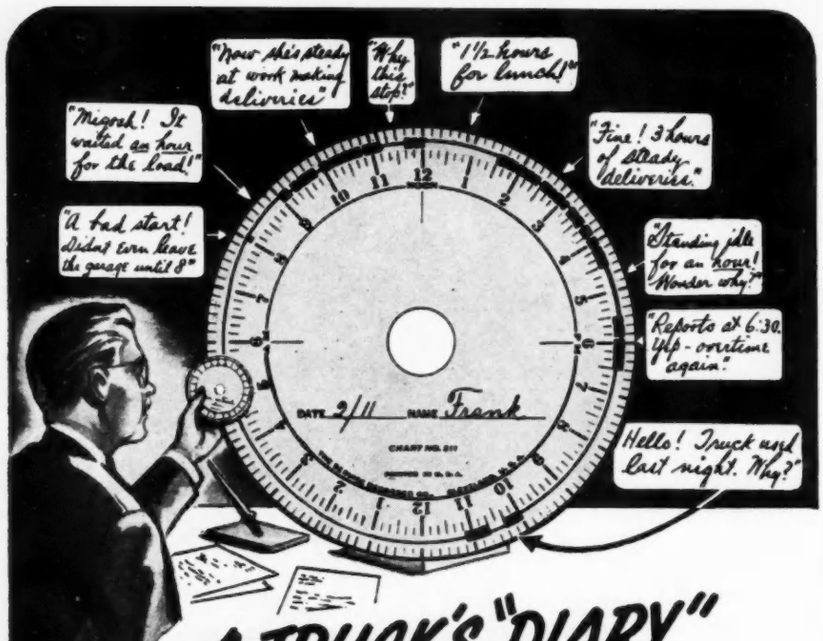
AND let us not underestimate the importance of the drivers themselves in their contribution to the success of the condition maintenance theory. The driver is often the first person to experience impending failures, when he notices undue noises, smoke, vibration, or any other factors that indicate trouble. Immediately upon checking in after a run he is expected to fill out a bus condition card listing items found unsatisfactory. Since many will take more pains when someone is present to *listen*, a checker is always available to them. With him they discuss operating problems about the particular bus. And finally a complete report is filled out. This goes to the garage foreman, who then has a guide to help in the inspection of the equipment.

All our drivers are competent to criticize their equipment intelligently. While not mechanics by any sense of the word, they are familiar with basic operating fundamentals. They are given six weeks of intensive training immediately after being hired. In this course they learn to recognize malfunctioning of various units and assemblies. They spend time in the shop observing the maintenance work so that they appreciate problems of maintenance.

And finally we attribute much of the cooperation between departments and individuals to the foreman's meetings which are held periodically at the central shop. Here we discuss operating and maintenance problems, iron out "beefs" and set up a standard operating procedure for all six garages. An example of a typical problem is this. We demand precision tests and so must have precision instruments calibrated so that all departments observe the same settings. To this end we set up adjustment tolerances and calibrate instruments. A spare for each instrument is kept here in the central shop so that it can be obtained in case of failure of its counterpart in the garage. In this way, when we specify point adjustment of .025 in., we mean it—and get it!

END

Please Resume Reading Page 69


"Now she's ready at work making deliveries"
"Why this stop?"
"1½ hours for lunch!"
"Migosh! It waited an hour for the load!"
"Fine! 3 hours of steady deliveries."
"A bad start! Didn't even leave the garage until 8"
"Standing idle for an hour! Wonder why?"
"Reports at 6:30. Up-overtime again."
DATE 2/11 NAME Frank
Hello! Truck used last night. Why?"

A TRUCK'S "DIARY"

with comments of the boss

Ask the efficient truck manager how he handles the "time problem". He will reply right away, "The answer is *easy.* First thing every morning we put a blank chart in the little *Servis Recorder* up in the cab of the truck. The next morning when that chart is laid on my desk, I can see everything the truck did the day before—busy time, idle time, overtime. *The truck wrote its own record.*"

That's the answer that well over a hundred thousand satisfied truck operators now give. And it is the answer that will so thoroughly satisfy YOU if you too equip *your* trucks with SERVIS RECORDERS—and thereby get better truck performance. Chances are you'll also add—"Don't see how we ever got along without 'em!" THE SERVICE RECORDER COMPANY, 1375 Euclid Ave., Cleveland 15, Ohio.

Write today for free booklet—"*Ten Ways of Getting More Work Out of Motor Trucks.*"

The Servis Recorder

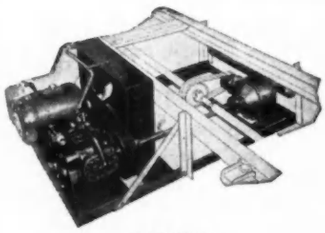
Tells Every Move Your Truck Makes

Whether you have a truck or a trailer to refrigerate, whether you want a semi-automatic or fully automatic operation, Kold-Hold can give you a better answer to your refrigeration problems. The addition of Kold-Trux "Mobilmatic" Highside Units to the proven line of Kold-Hold Lowsides provides several ways to refrigerate transportation equipment efficiently and economically. Kold-Trux Units can be used with "Hold-Over," Thin "Hold-Over" or Quick Action Plates to supply completely automatic and thermostatically controlled refrigeration requiring no attention from the driver. It is driven from a live axle, propeller shaft, or power take-off and engages and disengages without shock to the engine or transmission. A specially designed "Hydro-Pack" Blower is available for use with this system in high temperature application.

For semi-automatic operation, the newly redesigned "Hold-Over" Plates can be used with a mounted compressor or make-and-break connections to maintain predetermined truck temperatures for day-long trips.

Whatever your truck refrigeration needs, you can be sure of the right answer from Kold-Hold.

Which of these methods is best for you?



KOLD-TRUX

Which do you prefer . . . Mobile or Hold-Over truck refrigeration? Kold-Hold can give you either or a combination of both.

When your weather worries start, pick out the routes with the biggest refrigeration problems and call on Kold-Hold to give you a satisfactory solution. They will give you the right combination for your needs from such highsides as the Kold-Trux Mobile Unit, a mounted compressor, or make-and-break assemblies, coupled to such lowsides as Kold-Hold Hold-Over Plates, Thin Plates, Serpentine Quick-Action Plates, or Blowers.

Why not give us the details of your problems and let our engineers find the most efficient solution for you. Write today for details.

HOLD-OVER PLATES

Tell us your truck refrigeration problems and send now for complete data and literature.

KOLD-HOLD

Power Package "Jeep" Ups Payload

Continued from Page 84

also a slight acceleration advantage, because the rear engine is pushing while the front transmission gears are being changed.

As far as fuel consumption is concerned, it is somewhat better with two engines as long as road speeds remain equal. But generally speaking, it does not hold true because your average over-all road speed runs about 30 per cent higher with Dynassist. The operator has one of two choices. He can either have better fuel consumption economy and operate at the same road speed that he would with single engine or he can increase the number of miles per unit by someplace between 20 and 30 per cent.

The control system is completely automatic; however, the driver is able to take control away from the automatic system manually any time he wishes to.

One thing which might be interesting, is that it is not necessary to use automatic transmissions such as the Ford package which Brown has been experimenting with. We use International, Buick and GMC engines with almost any transmission and axle combination that the operator wants.

Shifting of the clash-box type transmission and 2-speed axle is accomplished with a synchronizing valve which ties into the rear engine throttle system. The valve is solenoid-operated from the tractor cab through the electric shift switches which bring in the rear axle or transmission range in which the driver wishes to operate. The actual shift is made with either air, vacuum or an electric 2-speed axle shift motor. Rear axle and transmission shifting is in no way synchronized with the tractor. The object of having a booster engine would be defeated by synchronizing the shifts of the rear engine to those of the front engine. If the shifts were synchronized, you would lose the benefit of the booster while changing gears in the tractor.

Of course, if we use an automatic transmission, the transmission shift switch which is mounted in the tractor, simply moves the manual shift control lever on the transmission. In other words, it accomplishes the same function that you accomplish in an automobile when you move the transmission range selector lever. The only thing that a fluid drive (torque converter or fluid coupling) does for you is let you stand still with the engine running without depressing a clutch pedal. If the operator desires to use a standard clutch and transmission assembly it is necessary to supply either a vacuum or air operated cylinder which disengages the clutch, while the vehicle is at rest.

The biggest field for the "power package" has been in equipment which operates both off the highway as well as on the highway. Driving the wheels which normally have to be dragged off-highway greatly adds to the vehicles cross-country mobility.

On self-loading floats we place the engine just ahead of the front axle and drive the rear axle of the tandem. This gives us adequate ground clearance beneath the engine to allow the nose of the float to rest on the ground while loading.

The float with the GMC engine weighs 10,388 lb and has a rated capacity of 50,000 lb.

END

Please Resume Reading on Page 85

BUILT especially to withstand the wear, tear and rough usage of commercial body service, Hansen Hardware reduces repairs, breakage and replacements to a minimum. Examples are the products illustrated:

No. 12-S Square-Corner Hinge. Leaf-type, two-ply, all-steel. 12" strap. Weight, 2¾ lbs.

No. 60 Lock. One-piece. 5" x 10". Hardened 1¼" striker bolt. Die-formed steel bushing.

No. 85 Regulator. Enclosed mechanism. Straight lift. Lead-coated to prevent rusting.

No. 70-D Refrigerator Door Lock. Lug-leverage action. Lugs and handle adjustable. Rod 72".

Whatever type of service in which Hansen-equipped trucks, trailers and tanks are engaged, Hansen stands up under hard, heavy-duty, grueling service — insuring steady performance and economy.

Hansen makes commercial body hardware in a complete line—Locks, Regulators, Hinges, Handles. What are your requirements?

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HANSEN
HARDWARE for Commercial Bodies

Trucker Switches to ALUMINUM WHEELS
Fleet Earns $7,500 Extra per Year

Alcoa Forged Aluminum Disc Wheels eliminate balancing troubles, increase tire mileage!

Weight saving was Acme Transportation's first reason for fitting fifteen truck-trailer units with Alcoa Aluminum Forged Disc Wheels. And each unit has since earned a $500 per year bonus due to extra pay load. A $7,500 reason to recommend Alcoa Wheels to other operators.

But the fifteen units—many with over 250,000 miles of rugged mountain service—proved Alcoa Wheels had other advantages. Their perfect roundness and balance eliminated front end balancing troubles and increased tire mileage. Their corrosion resistance eliminated painting, made tire changing easier.

Acme states, "In view of our experience, we would use the Alcoa Wheel even if weight saving were not a consideration, because it is the best balanced, strongest, most economical wheel we have seen, as well as being by far the lightest."

Alcoa Aluminum Forged Disc Wheels are available as optional equipment through your truck or trailer manufacturer. ALUMINUM COMPANY OF AMERICA, 1871-E Alcoa Building, Pittsburgh 19, Pennsylvania.

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

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. . . The Case for Aluminum

Continued from Page 76

bodies, you've had it! But, if you're willing to pay the higher initial cost for an aluminum body, your over-all costs can be shaved.

Replacing a steel body with an aluminum body on the same chassis provides two alternatives: (1) You can maintain the same payload and reduce the gross vehicle weight. (2) You can increase the payload while maintaining the same gross vehicle weight. Since bulk rather than weight is the limiting factor of most retail delivery loads, the second alternative will appeal to only a few classes of operations.

Cost Savings

WITH a lower gross vehicle weight you again have two alternatives: (1) You can use a chassis with a lower nominal weight rating with a resultant saving in initial purchase price. This also results in a saving in the purchase of component parts, particularly tires, throughout the life of the vehicle. (Price tables show that in many cases the lower chassis cost will offset the higher price of the body. For example, a bakery fleet saved $450 on the initial cost of a lighter chassis made possible by using an aluminum body costing approximately $500 more than a similar steel body.)

(2) You may retain the same chassis used with a steel body and save on maintenance costs through less strain on the chassis, engine, and component parts, with particularly notable savings on tires.

Let us consider alternative (2). For the sake of argument assume that a fleet has two identically equipped chasses with a known maximum GVW rating (including payload) of 7000 lb.

Vehicle S, with a steel body has an unloaded actual weight of 5300 lb. Vehicle A, with an aluminum body has an unloaded actual weight of 4800 lb. Both bodies have comparative cubic capacity. Each vehicle is assigned a payload of 1000 lb.

Therefore Vehicle S has a loaded weight of 6800 lb, while Vehicle A has

(TURN TO PAGE 140, PLEASE)

As long as water vapor is not completely vented from the crankcase, condensed water and lube oil will continue to build sludge and "varnish." On stop-and-go operations, where the temperature of the crankcase is relatively low, you'll have even more sludge formation than on long-haul runs.

Get Rid of That Water as Fast as It Forms

That's the function of Magnus Metaffin. You add it regularly to your lube oil, maintaining a suitable concentration in accordance with the type of road service on which your trucks are operated.

As long as this concentration is maintained in your lube oil, Metaffin will keep condensed water finely divided and dispersed throughout the body of the oil, in a condition that insures thorough venting. Sludge cannot form, because the essential ingredient, condensed water, will not be present.

TRY IT ON A COUPLE OF ENGINES!

Watch for improved oil economy . . . better compression . . . faster starting . . . and above all for materially reduced maintenance costs. We'll be glad to supply the necessary Metaffin at no cost if you'll pick the engines for the trial!

magnus

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Service Representatives in Principal Cities

NO NEW TIRES IN 3 YEARS!

"A while back our tires were running hot, and we were suffering so many failures that the expense began to worry us," says D. A. Beard, Jr., of the Beard Truck Lines in Houston, Texas." We were using 20x7.00 wheels with 10.00 tires.

"Not only that, but our wheel breakage was excessive, since we were trying to use original equipment wheels with oversize tires on our daily runs, carrying maximum loads between Houston and Dallas.

"About three years ago, we called in L. D. Griswold of Southwest Wheel & Equipment of Houston, to see if they could find a way to get us out of this trouble. Griswold suggested that we change over to Budd 20x7.5 wheels with wide base rims and a taper under both bead seats. We figured it was worth trying.

"Believe it or not, since we made the changeover, we haven't purchased a single new tire. And our trucks are on the road constantly, with breakage so low it's not worth thinking about. Actually, when you add it up, our costs on tires, wheel breakage and maintenance have been reduced by 25%, as compared with our expense prior to the changeover.

"Our 11 tractors and 18 trailer units are really earning their way . . . thanks to Southwest Wheel and The Budd Company."

W A Beard Jr

THE BUDD COMPANY, DETROIT 15

Budd

LOUISVILLE—Auto Wheel & Rim Service
LUBBOCK—Southwest Wheel, Inc.
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NEWARK—Automotive Safety Inc.
NEW HAVEN—Connecticut Wheel & Rim Co.
NEW ORLEANS—Southern Wheel & Rim Co.
NEW YORK—Wheels, Incorporated
OKLAHOMA CITY—Southwest Wheels, Inc.
OMAHA—Morgan Wheel & Equipment Co., Inc.
PEORIA—Peoria Wheel & Rim Co.
PHILADELPHIA—Thomas Wheel & Rim Co., Inc.
PITTSBURGH—Wheel & Rim Sales Co.
PORTLAND—Six Robblees', Inc.
PROVIDENCE—New England Wheel & Rim Company
RALEIGH—Carolina Rim & Wheel Co.
RICHMOND—Dixie Wheel Co., Inc.
ROCHESTER—Frey, the Wheelman, Inc.
SALT LAKE CITY—Henderson Rim & Wheel Service
SAN ANTONIO—Southwest Wheel & Equipment
SAN FRANCISCO—Wheel Industries, Inc.
SEATTLE—Six Robblees', Inc.
SOUTH BEND—Wire & Disc Wheel Sales & Service
SPOKANE—Bearing & Rim Supply Co.
SPRINGFIELD, ILL.—Illinois Wheel & Brake Co.
SPRINGFIELD, MO.—Borbein, Young & Co.
ST. LOUIS—Borbein, Young & Co.
ST. PAUL—Wheel Service Co.
SYRACUSE—Colbourn Wheel & Rim Service, Inc.
TACOMA—Six Robblees', Inc.
TOLEDO—Wheel & Rim Sales Co.
WICHITA—Borbein, Young & Co.
WINSTON-SALEM—United-Automotive Service

EXPORT
CLEVELAND—C. O. Brandes, Inc.

CANADA
CALGARY—Mutual Supplies, Ltd.
EDMONTON—Alberta Wheel Distributors, Ltd.
MONTREAL—Auto Wheels & Supplies, Ltd.
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flexible!

International Harvester made this convincing proof of flexibility of the Hendrickson Tandem on their LF-170 over the "twist course" at their Ft. Wayne proving grounds.

Where extreme flexibility is required

Specify HENDRICKSON TANDEM

ON

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- TRAILERS
- SPECIAL EQUIPMENT

HENDRICKSON MOTOR TRUCK COMPANY

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. . . The Case for Aluminum

Continued from Page 136

a loaded weight of 6300 lb. Vehicle A has 10 per cent lower GVW than Vehicle S. The 500-lb difference between an aluminum body and a steel body of the same capacity is not an extreme figure. It frequently is as great as 1000 lb.

Now, let us see what that difference in loaded weight means in terms of operating costs:

Gas Mileage: Since fuel mileage is at least partly governed by the GVW, then, other factors being equal, Vehicle A should get 10 per cent greater gas mileage than Vehicle S. Over a 10-year period this would mean that you would save one year's gas costs with Vehicle A.

For example, a bakery fleet with 13 aluminum bodies on vehicles with an average total mileage age of 69,538 miles obtained an average of 11.6 miles per gallon. The same company had 15 steel bodies on vehicles with an average total mileage age of 71,444 miles and obtained an average mileage of 9.2 miles per gallon.

So, while admitting a 2.5 per cent difference in mileage age between the two groups, there is still approximately a 20 per cent difference in miles per gallon obtained.

For fair comparison purposes, in a discussion before the Society of Automotive Engineers, J. H. Dunn of the Aluminum Company of America estimated that gas mileage of a light delivery truck can be increased by 10 per cent by switching from a steel body to a lighter-weight aluminum body on the same chassis.

Tire-Life: It has been estimated that a 10 per cent decrease in GVW means a 25 per cent increase in tire life. Tire costs for Vehicle A should therefore be 25 per cent lower than for Vehicle S.

Chassis and Parts Life: Rate of acceleration and gradeability of a vehicle are directly related to the GVW, since it is a physical law that the greater the mass of a vehicle, the greater its inertia. With 10 per cent lower loaded weight, Vehicle A should have 10 per cent faster acceleration, 10 per cent more gradeablity than Vehicle S.

Relating this to the effect on the chassis and the enginee:

Vehicle A requires 10 per cent less engine power than Vehicle S for the same rate of acceleration and the same gradeability. Therefore, Vehicle A can do the same work as Vehicle S in the

(TURN TO PAGE 142, PLEASE)

TESTED and found best!

That's why Detroit-Wayne Major Airport chose SHELL RIMULA OIL for service vehicles...

Fire trucks at the Detroit-Wayne Major Airport were a particularly acute maintenance problem. They were running most of each 24-hour day . . . but 80% of this running time their engines were idling.

This low-temperature, slow-speed operation proved extremely difficult because of sludge, ring plugging and cylinder wear. Recently, when air cargo traffic doubled, the Detroit-Wayne Major Airport Manager decided that this problem *must* be solved.

Although they had been using good lubricating oil, it was thought that a different type might be the answer. So they tried Shell Rimula Oil in several vehicles—two 4-wheel-drive 1½-ton fire trucks, and two ½-ton pick-ups. This equipment averaged 1,000 miles a month.

Results? Spectacular! Oil consumption in the fire trucks dropped from seven to *four* quarts a month through effectiveness of the oil in removing some of the previous deposits. In the pick-ups, consumption dropped more than 50%. Furthermore, the engines were being cleaned up rapidly . . . so much so, that scheduled major overhauls were postponed.

If your own operating conditions are severe, Shell Rimula Oil was made especially for you! It fights acidic materials causing corrosion. It minimizes sludging. It cuts down ring deposits. It's a *tough* oil for *tough* service.

* * *

For further information on the cost-cutting advantages of Shell Rimula Oil, write Shell Oil Company, 50 West 50th Street, New York 20, N. Y.—or 100 Bush Street, San Francisco 6, California.

SHELL RIMULA OIL

SHELL

... The Case for Aluminum

Continued from Page 140

same time and with 10 per cent less strain on the engine, chassis and component parts. Theoretically, Vehicle A can do the same job 10 per cent faster with the same strain on the vehicle.

License Fees: In most states, license fees are based on the GVW of the vehicle. Assuming an arbitrary licensing rate of 1¼ cents per lb GVW, then a license for Vehicle A would be $6.25 cheaper than for Vehicle S, while both trucks would be carrying the same payload.

Vehicle Life

IT IS an accepted principle that parts are built to withstand a definite maximum load for their estimated life. Increase the load past maximum and, generally speaking, you automatically reduce the estimated life of the part. Manufacturers' guarantees are predicated on the condition that the maximum rating of the part is not exceeded.

From the standpoint of operating costs, then, let's examine the problem of maximum loads and load distribution.

To avoid excessive operating and maintenance costs you should know the exact weight you can carry in actual payload, including driver and racks. From this you can calculate what percentage of the loaded vehicle weight is payload. Experience shows that the permissible payload (without overloading the rated capacity of axles, springs or tires) ranges from 3½ per cent to 53 per cent of the loaded vehicle weight. The more dead-weight of chassis and body you have to pay for mov- the higher your delivery costs per dollar of payload delivered.

Your method of determining per missible payload is important!

For example: Truck "S" with 7000 lb nominal GVW is equipped with 7.50 x 16-8 ply tires. Chassis and empty body weigh 2511 lb front and 2789 lb rear. Assuming payload distribution percentages of 5 per cent front and 95 per cent rear, how much payload weight, including racks and driver, can you carry without overloading the rear tires which are rated at 1860 lb each?

One method of solving this question is to deduct the sum of the chassis and body weights from the nominal GVW and assume that this gives you the permissible payload. In this case the answer would be 1700 lb payload. On the surface, this may seem reasonable. But now let's take a closer look.

The 5300 lb chassis and body weight is distributed with 2511 lb front, 2789 lb rear. Rear tires have a rated capacity of 1860 lb each or a total capacity of 3720 lb. But the rear tires are already carrying the weight of the rear part of the body and the chassis, so the payload may be only 931 lb. Payload distribution is 5 per cent on front and 95 per cent on rear. Therefore, 931 lb represents 95 per cent of a permissible payload of 983 lb.

By using the first method you are overloading the rear tires by more than 769 lb. While this is obviously an extreme example, it does point up the need for care in calculating your permissible payload.

Other Factors

IN addition to the saving in weight, aluminum can mean other cost sav-

(TURN TO PAGE 144, PLEASE)

RIKER 'QT'

QUIET TONE

HEAVY DUTY TRUCK and BUS MUFFLERS

MR. RIKER says:

"A Reminder . . . where you need to IMPROVE PUBLIC RELATIONS try a RIKER "QT" MUFFLER."

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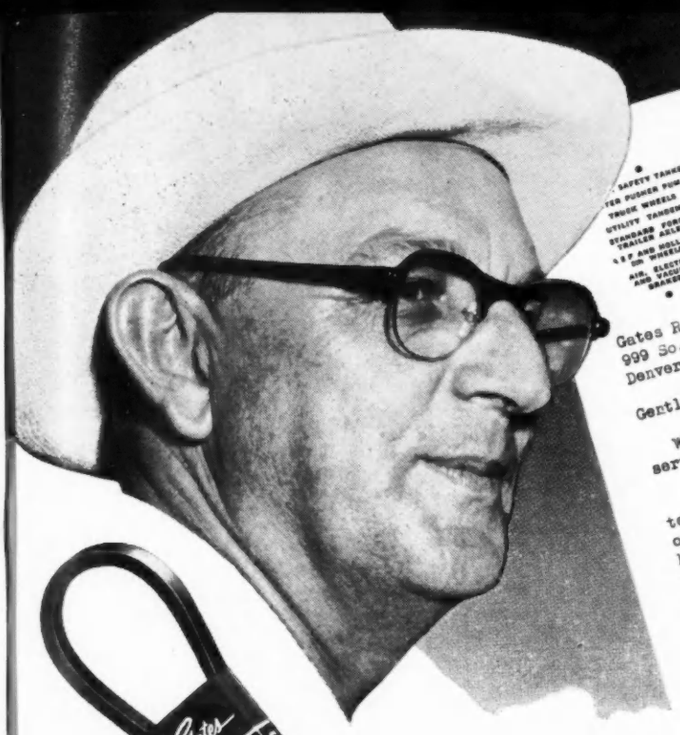
FREIGHT LOADER: "WHAT KIND OF LIPSTICK IS THAT?"

BUXOM BLONDIE: "KISS-PROOF."

FREIGHT LOADER: "WELL, RUB IT OFF—WE'VE GOT WORK TO DO!"



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We thought you might be interested in hearing of the remarkable service we are getting from your products.

We have been in our present type of business for approximately ten years and during that time we handled some belts and hose other than Gates. A few years ago we changed to Gates 100% and have found that we receive from 50% to 75% longer life from your famous T, TG and TS series of belts, than from any other brand that we previously handled.

We service all kinds of trucks and truck-tractors from every state in the Union and have found that your catalogue and specifications are always up to date and we know that a Gates belt is always a perfect fit which assures the customer of maximum service.

Yours very truly,
Truck & Trailer Equipment Co.
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tough, multiple-ply cover developed by world's largest maker of V-Belts.

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Look for this T*

To get 50% to 80% more service out of fan belts look for this "T" on both label and belt. The "T" is your assurance of a belt specially engineered for Trucks and Buses.

*REG. U.S. PAT. OFF.

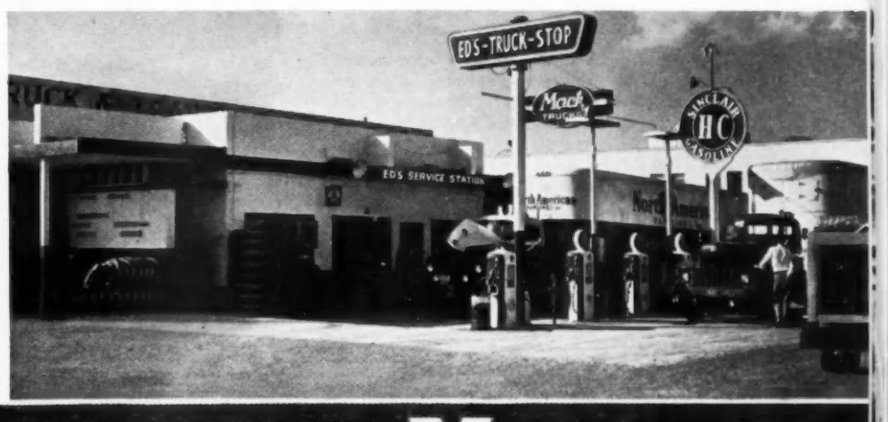
Those 3 headlines tell you *why* the Truck & Trailer Equipment Co., of Waco, Texas, uses Gates "T" Belts *exclusively* in servicing big trucks and truck tractors from all parts of the country.

Like truck maintenance men all across the country, this progressive truck service firm knows from actual experience that Gates "T" Belts — specially engineered for trucks and buses — wear from 50% to 75% and even 80% longer.

To their truck customers therefore, this means road delays due to fan belt failures are practically eliminated . . . trucks keep on schedule . . . *net operating time is kept UP* . . . revenue and profit are increased.

The longer service life of Gates "T" Belts makes money for truck operators another way — belt replacement costs are cut in half, and far more than half according to written statements from Fleet Managers, Purchasing Agents and other users from coast to coast.

It's easy to prove to yourself the cost-cutting, money-making performance of the Gates "T" Belt — simply install it on your equipment and match its record against any other belt you have ever used. There is a Gates Belt jobber near you who will supply you promptly with the Gates Belts you need. The Gates Rubber Co., Denver, U.S.A. — *World's Largest Maker of V-Belts.*



GATES TRUCK & BUS V-BELTS

. . . The Case for Aluminum

Continued from Page 142

ings in body maintenance. Aluminum resists corrosion. As a result, skins can be left bare and look neat, and painting costs are held to a minimum. If, for advertising reasons, painting is desired, money can still be saved. Adherence of paint to aluminum is exceptionally good and painting is required only half as often as with steel.

One fleet provides the following time study of painting operations with the two types of bodies. Time required to clean and refinish aluminum—42½ hr.; time required for the same type of work on steel bodies—56 hr. Thus, with aluminum bodies paint costs were reduced over 30 per cent.

In addition to this example, it is also worthwhile to mention that aluminum bodies do not require inside painting. The bare metal reflects light and provides a natural brightness.

While aluminum also possesses high anti-corrosion characteristics, corrosion may occur where two dissimilar metals are in contact, such as when steel rivets are used in an aluminum body. Corrosion may also occur in the presence of moisture, resulting in a galvanic cell action. This condition can be remedied by priming both steel and aluminum with zinc chromate primer and using a plastic sealer in the joint to prevent the entrance of moisture. In the battle against corrosion, all crevices and pockets should be avoided or sealed off in this manner.

Corrosion may also occur where a moist solid such as wet insulation, wet wood or floor dirt is held in contact with the aluminum. This screens off oxygen and can be dealt with by priming, as described above. In the dairy fleet field it was once true that the aluminum bodies then in use had low resistance to the lactic acids and caustic solutions common to this industry and thus had a relatively short life. Alloys now available, however, resist this type of corrosion when properly primed.

Since you can normally expect to get longer life from an aluminum body, it should be of a type which can be readily removed and mounted on a new chassis. Also it should be properly engineered for the best use of the material, whether it is of the heavy-panel-frameless construction or the thin-skinned variety with properly extruded frames. Maximum dent resistance can be attained through the use of the heavy-panel type. Engineers will provide stress data for those fabricating their own bodies, and in the case of aluminum body manufacturers selling to fleets these factors have been considered in the design so that such problems will not occur.

What these qualities mean in terms of cost saving is best illustrated by the example of a large bakery fleet in the East. Over a three-year period this fleet found that aluminum bodies required no anti-corrosion maintenance, was able to list a 100 per cent saving in this part of its cost picture.

If your bodies are of the heavy ⅛-in. panel type, you get an added saving from the cost of repairing dents and minor traffic damage without added weight.

Finally, the initial higher cost of an aluminum body is not a total loss, since, after giving longer life with less weight on the chassis and the many other cost savings explained here, when you finally reach the point where the body has to be sold for scrap, it has a relatively higher per pound value than a steel body.

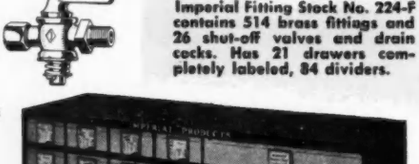
END

Please Resume Reading Page 77

NO TIME LOST

in getting the BRASS FITTINGS SHUT-OFF VALVES FLEXIBLE LINES you want . . . .

Imperial Fitting Stock No. 224-F contains 514 brass fittings and 26 shut-off valves and drain cocks. Has 21 drawers completely labeled, 84 dividers.



Imperial Flexible Line Make-Up Stock No. 315-FNA contains 3 sizes of hose and 144 attachable fittings for making up virtually all needed flexible lines. 12 drawers for fittings, 3 for hose, all completely labeled.

These Imperial Stocks are ideal for fleet owners. They contain the most needed brass fittings, shut-off valves, flexible hose and attachable fittings for handling gas and oil line work in a hurry.

No time lost—the right parts are instantly available from convenient compartments fully labeled to show illustration, size and catalog number. Fitting, shut-off valve and drain cock wall chart aids in selecting the right parts for the job. Costly pick-ups and delays are eliminated. Re-ordering is easy. No wasteful overstocking.

Various sizes of stocks to meet your needs. Cabinets can be placed in shelving or on the bench or floor. Additional cabinets can be added as required. Ask for Catalog No. 124.

Imperial Fitting Stock No. 430-FC contains 218 fittings. Has 5 drawers, 100 fully labeled compartments. A small broad coverage kit.

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Brass Fittings • Flexible Fuel Lines • Tube Working Tools • Battery Hydrometers • Barrel Faucets • Welding Equipment

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★ Reduces Ring Wear 15%
★ Gives 13% More Compression

You've heard all sorts of wild claims for lubrication "aids." Now, get the *facts* about Miracle Power—*proof* established by Wetmore Hodges & Associates, Redwood City, Calif., independent research laboratory.

Hodges tested two factory-new truck engines hauling both gravel and salt (38 ton G.V.W.) under identical conditions. They used Miracle Power in one engine, not the other. The engine without Miracle Power broke down after 33,703 miles. The Miracle Power treated engine was still in good shape. The amazing performance records were proved by accurate data, scientifically maintained.

Miracle Power contains a secret blend of colloidal synthetic graphite and other super lubricating agents. Used in gas and oil, Miracle Power covers vital engine surfaces with a breathlike graphoid film which retains oil longer, lubricates even if oil is temporarily absent or breaks down under terrific engine heat.

Miracle Power will protect *your* truck engines and reduce operating costs. Get the full story of the amazing Miracle Power test today from your AP wholesaler or write—

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Fleet Training Courses

FLEET training courses have shown themselves to be a cost cutting way in obtaining the trained men needed in truck and bus fleet operation. Here is a list of such courses scheduled throughout the United States. Additional listings are welcome.

MAY

11-15—Motor Fleet Supervisor Training Course, University of Michigan, Ann Arbor, Mich.
11-22—Course for Trainers of Commercial Drivers, Michigan State College, East Lansing, Mich.
18-22—Motor Fleet Supervisor Training Course, Western Reserve University, Cleveland, Ohio.
25-29—Motor Fleet Supervisor Training Course, Rutgers University, New Brunswick, N. J.

JUNE

8-10—Motor Carrier Claim Prevention Training Course, Michigan State College, East Lansing, Mich.
8-12—Motor Fleet Supervisor Training Course, University of Texas, Austin, Tex.
9-11—Motor Fleet Supervisor Refresher Conference, Northeastern University, Boston, Mass.
15-26—Course for Trainers of Commercial Drivers, Northeastern University, Boston, Mass.
15-19—Motor Fleet Supervisor Training Course, University of Texas, Austin, Tex.
22-26—Motor Fleet Supervisor Training Course, Northwestern University, Evanston, Ill.
22-26—Motor Fleet Supervisor Training Course, University of Texas, Austin, Tex.
25-26—Motor Fleet Supervisor Refresher Conference, Northwestern University, Evanston, Ill.

AUGUST

31-Sept. 4—Motor Fleet Supervisor Training Course, University of Denver, Denver, Colo.

SEPTEMBER

14-18—Motor Fleet Supervisor Training Course, Institute of Public Safety, Pennsylvania State College, State College, Pa.
21-25—Motor Fleet Supervisor Training Course, Purdue University, Lafayette, Ind.
28-Oct. 2—Course for Trainers of Commercial Drivers, University of Nebraska, Lincoln, Nebr.
28-Oct. 2—Preventative Maintenance Course for Fleets, Rutgers University, New Brunswick, N. J.
28-Oct. 2—Motor Fleet Supervisor Refresher Conference, (tentative), University of Minnesota, Minneapolis, Minn.

OCTOBER

12-16—Course for Trainers of Commercial Drivers, Institute of Public Safety, Pennsylvania State College, State College, Pa.

NOVEMBER

2- 6—Motor Fleet Supervisor Training Course, University of Illinois, Urbana, Ill.
2- 6—Course for Trainers of Commercial Drivers, University of Georgia, Athens, Ga.

. . . The Case for Steel

Continued from Page 77

In the vast majority of multi-stop operations, load limitations are not determined by weight but by bulk. The cubic capacity of the body generally limits the size of the load in these operation (5000 to 10,000 GVW group).

In multi-stop delivery operations the operator therefore cannot generally take advantage of pounds saved through vehicle weight reduction. Where, then, does the operator find advantage in the aluminum man-high body?

Saving in fuel is one claim which has been offered. The estimates and reports on fuel economy offered (up to 10 per cent, is one; two miles per gallon of gasoline is another) are quite favorable for the case for aluminum, but the fact that there is a wide variance (variance of up to 100 per cent or more) should be noted.

Here are the results of an actual test, run as nearly as possible under truly objective test conditions:

Three new trucks with multi-stop bodies of identical design, transmissions, axle ratios, engines and tire sizes were operated over one route. They covered the same mileage at the same speed, and made the same number of stops. Different drivers were used.

Gross vehicle weights (actual scale weights) of the trucks:

Truck No. 1—6000 pounds GVW
Truck No. 2—6500 " "
Truck No. 3—7000 " "

Truck No. 2 used 2 per cent more fuel than Truck No. 1.

Truck No. 3 used 4.1 per cent more fuel than Truck No. 1.

The savings in fuel consumption of the lighter trucks are maximum because the tests were not conducted with diminishing payload.

Using 10 miles per gallon for Truck No. 1, and the arbitrary figure of 25 cents per gallon as gasoline cost, as a means for interpreting the test results generally, it may be determined through exercise of grocery store arithmetic that Truck No. 1 will burn about 42 gal of gasoline less during a 10,000-mile year than will its 1000-pound-heavier fleet fellow.

At 25 cents per gallon, this is a saving of about $10.50 per year in fuel. This saving is insignificant when compared with the factors of greater initial cost and greater maintenance cost.

It should be noted, incidentally, that the claims regarding the savings of two miles per gallon of gasoline, and 10 per cent less fuel, pertain to bodies whose lighter weight was achieved not only by use of light metal in construction but also by eliminating side panel frames and liners.

Many multi-stop operations concerned with delivery of perishables (such as bakeries, candy manufacturers and jobbers, baby chick delivery and others) are required to insulate their truck loads against heat and cold. In the steel body insulation is readily installed in the air space between inner and outer panels.

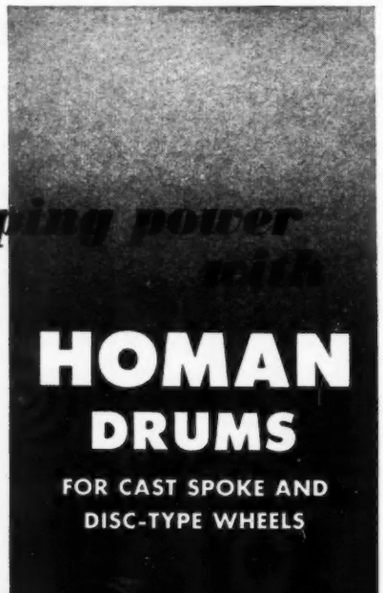
Insulation of the aluminum body—aluminum being a better conductor and radiator of heat than steel—adds to its cost (because of addition of inner liners, frame members, insulation, etc.) and usually destroys the weight advantage. Bodies of box-frame construction with inner liners providing air space insulation are of approximately the same weight whether made of steel or aluminum.

(TURN TO PAGE 151, PLEASE)

more stopping power with

HOMAN DRUMS

FOR CAST SPOKE AND DISC-TYPE WHEELS



Homan Brake Drums are made of the finest close grain, chrome iron alloy for longer, more efficient wear. They are precision machined to insure concentricity, longer brake lining life and to guarantee an even braking surface. Designed and built to dissipate heat quickly and minimize checking.

Homan Drums are a sound investment in preventive maintenance.

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ESTABLISHED 1847

For Fast Dependable Service Ship by Truck Trailer

. . . The Case for Steel

Continued from Page 148

The possibility of going to lighter and less expensive chassis because of the reduction of 500 to 1000 lb with the use of light-metal bodies may be suggested. This actually defeats the ultimate objective of the user. The lighter chassis with its smaller and weaker components will cost considerably more to service during the life of the vehicle, contributing toward a higher rather than a lower operating cost over a period of years.

Actually, examination of multi-stop operating expenses as regards weight of the delivery unit should include both chassis and body. As that is not properly a part of the question, it will not be discussed here.

It is of interest to note that some large bakery fleets, along with fleets in other multi-stop delivery fields, have returned to steel bodies after experience with light metal bodies.

Initial Cost

TO obtain low truck prices requires quantity production and, among other factors, low cost material for the bodies.

This material must lend itself readily to quantity production techniques: it must be cut, formed, joined and finished with expenditure of the least possible amount of man-hours of labor.

That means steel. As compared with other common metals available steel has these advantages:

1. A given thickness of steel is stronger.

2. Steel in units of equal strength costs about one-third compared with light metals.

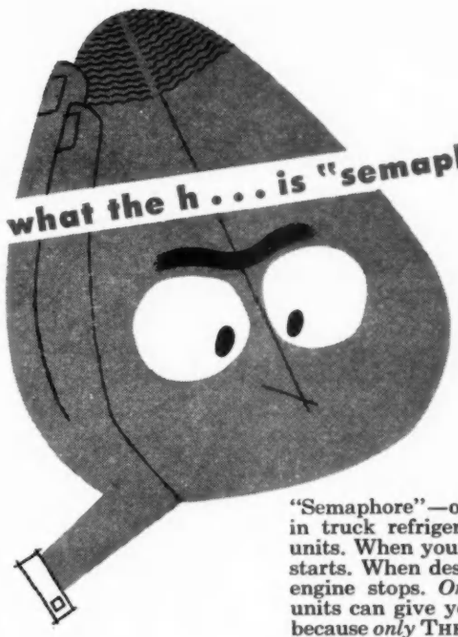
3. It is readily cut, formed, joined and finished at low expenditure of man-hours.

4. It is universally and quickly available.

Various kinds of steel are used in the manufacture of multi-stop bodies, and among them are differences in quality, durability, strength. One leading manufacturer uses hi-tensile alloy — more durable with rust-resistant qualities, as well as stronger with less weight, when compared with body steel commonly used by some other manufacturers. In the design of the body the manufacturer achieves weight and cost saving along with maximum strength and durability by careful selection of the type and gage of steel best suited for each part.

The use of this hi-tensile steel has, during the course of development of the steel man-high body, permitted re-

(TURN TO PAGE 152, PLEASE)



"Semaphore"—or, "STOP-and-GO" cooling is found in truck refrigeration *only* with THERMO KING units. When your cargo needs cooling, the engine starts. When desired temperature is reached, the engine stops. *Only* THERMO KING refrigeration units can give you this money-saving advantage because *only* THERMO KING has a *patented* starter-generator and the special electrical circuit that makes "STOP-and-GO" cooling possible.

Without this unique feature in a truck refrigeration unit, it is necessary to run the engine *all the time* . . . slowing it to idling speed when cooling is not called for.

THERMO KING'S "STOP-and-GO" operation cuts these unnecessary fuel costs . . . reduces engine maintenance. Saves you money!

"semaphore" cooling is exclusive with

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TRANSPORT REFRIGERATION UNITS

EXCLUSIVES!!

- One piece package—easy to install.
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U. S. THERMO CONTROL CO.

World's Largest Builder of Gasoline Engine Powered Refrigeration Units.

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Gentlemen: Please send immediately complete information regarding Thermo King mechanical Refrigeration for trucks and trailers.

Firm _____

Address _____

City _____ Zone _____ State _____

... The Case for Steel

Continued from Page 151

duction of the overall dead weight of the body by approximately 500 lb—while initial and maintenance costs remain at the lowest point and utility and durability have held steady and even improved.

Maintenance

MAINTENANCE costs dictate the use of steel in multi-stop delivery bodies because steel is (1) readily available, (2) economical to buy and (3) easily repaired.

Localized dents can be easily bumped out of steel bodies, or, selective parts of steel bodies or of steel panels can be cut out and replaced by welding. Steel bodies as a rule have sections attached by spotwelding. These are easily removed with cold chisel and hammer or with a drill. Repairs to steel bodies do not require the use of elaborate technique by highly trained repair men.

On the other hand, repair of aluminum bodies is much more costly. Dents cannot be readily bumped out. Replacement of entire panels is costly both as regards to (1) cost of replacement panel and (2) labor.

Most aluminum bodies have sections attached by rivets as the metal is not easily welded. Removal of rivets with a chisel may tear or elongate the holes in the piece to which the damaged panel is fastened. Some sections are attached with as many as 100 rivets, which means excessive labor cost.

Painting

ONE item in maintenance cost is paint. On steel bodies painting prices charged by the largest manufacturer of multi-stop bodies (for one color) is $51 net. This figure is considerably less than costs claimed by an aluminum body manufacturer.

Paint adheres equally as well to steel or aluminum provided the metal is etched and free of dirt, grease and oxides.

The overall economics of body painting tend to favor steel as preparation of the metal is simpler. Steel does not require as much etching as aluminum as the surface of cold rolled sheet is not as smooth as aluminum and it can be cleaned with low cost alkalies that would damage aluminum.

Steel may also be sealed by being painted a finished coat directly over a chemically cleaned surface with no primer, the surface being treated before final assembly. Also steel is cleaned and etched with a low cost solution, primed, sanded and painted. Both methods effectively seal the metal with one finish coat of paint.

Aluminum must be cleaned and etched, usually with an alcoholic phosphoric cleaner, to remove dirt, grease, and etch the metal. Although it is possible to use other primers on aluminum, the most protective is one pigmented with zinc chromate. Both cleaner and primer tend to be more expensive than those used on steel. The finish coat must be of a paint that is compatible to the prime coat. Often this calls for a more expensive paint.

Mechanical removal of paint from aluminum should be easier than from steel as the metal surface is inherently

(TURN TO PAGE 154, PLEASE)

SAFEST!
DRIV-EEZ
Patent Applied for
TRUCK and BUS MIRROR

Your safety is our business, and fleet operators, schools and safety engineers throughout the United States attest to the outstanding and *exclusive* features of DRIV-EEZ truck and bus mirrors.

- 100% adjustable— vertical, horizontal and circular
- "Blind spots" eliminated
- Vibration-less tubular aluminum construction
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BETTER DRIVING VISION FROM EVERY ANGLE!

Inquiries from Dealers, Jobbers, Bus & Truck Lines Invited!

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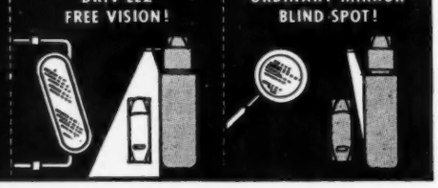


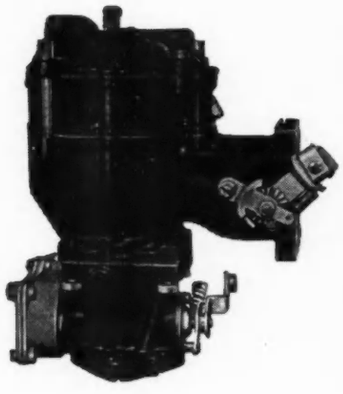
Steno Maisie: "What happened to that fancy new boy friend you were stepping around with last week?"

Steno Daisy: "Oh, I had to get rid of him, but fast. He told me he was a Bachelor of Arts from Philadelphia and I found out he had a wife and family in Pittsburgh."

Does Your Truck Have Sales Appeal?

IT ALL DEPENDS
ON PERFORMANCE
and
PERFORMANCE
DEPENDS ON

Zenith
CARBURETORS



In the practical field of commercial transportation, product preference is determined solely on performance. Nothing contributes more to the achievement of this desirable end than efficient carburetion. You can be sure that manufacturers whose vehicles are equipped with Zenith, the leader in the field of heavy duty carburetion, have measured carburetion costs in lasting terms rather than initial expense. Zenith's rugged construction, strong idling, freedom from stalling and response to every power demand gives any commercial vehicle added sales appeal. It pays to specify Zenith — the engineers' choice for trouble-free operation.

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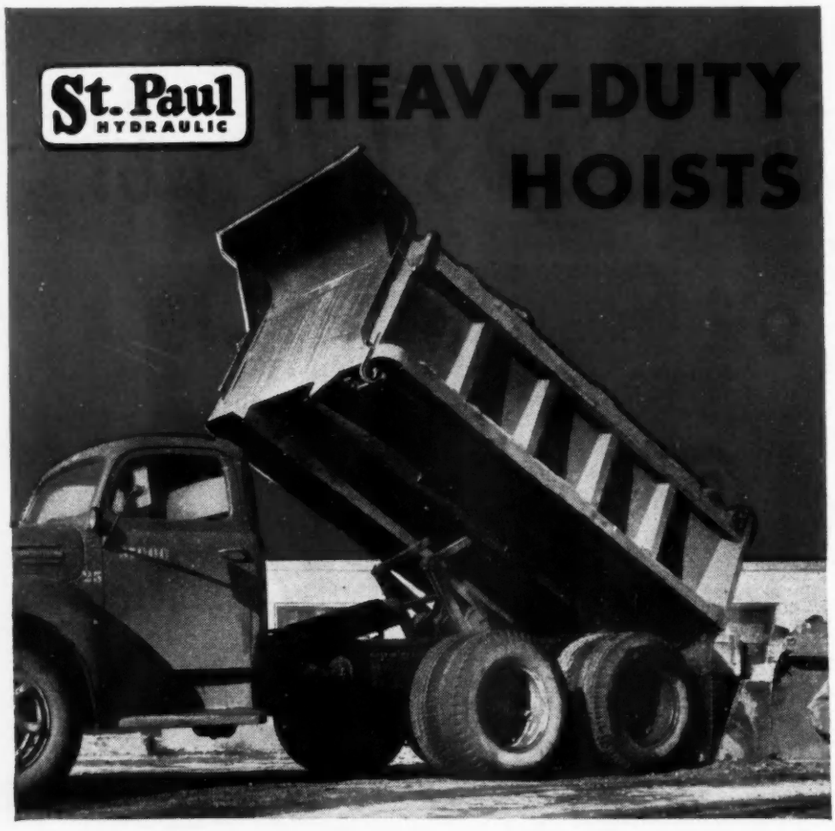


Give you FASTER, EASIER DUMPING with less down-time, lower maintenance!

On *big yardage jobs* especially, you can't afford to be "penny-wise" in buying hoists because one hoist failure can quickly eat up many hours of payload earnings. That's why it will pay you to *standardize* on new St.Paul heavy-duty hoists because *only* St.Paul gives you:

1. ***New stress-proved design*—with 25% greater lifting leverage, plus new friction-free hydraulic system, stronger equi-lift strut arms, replaceable bushings, and over 50 other advanced mechanical improvements.**
2. ***New "work-rated" capacities*—with extra safety factor to minimize danger of overloading and insure extra hours of trouble-free performance.**

Your St.Paul Distributor will gladly analyze your hoist problem and recommend the St.Paul model best suited to your needs. Call him today. St.Paul Hydraulic Hoist, Customer Service Dept., 36131 Main St., Wayne, Mich.

6 New Heavy-Duty Models
for every size body!

9′ to 13′ body L 20 8 to 12½-ton cap.	10′ to 14′ body L 24 8 to 12-ton cap.
10′ to 16′ body 2 H 20 10 to 17½-ton cap.	10′ to 16′ body 2 L 20 13 to 22½-ton cap.
10′ to 16′ body 2 L 24 16 to 27½-ton cap.	10′6″ to 14′ body HI-DUMP 3 to 8-yd. cap.

S-HC-3

OUR 41st YEAR

St. Paul HYDRAULIC HOISTS

Send for your FREE copy of the new St.Paul heavy-duty catalog — just off the press!

oldest in reputation . . . newest in cost-saving features.

. . . The Case for Steel

Continued from Page 152

smoother. Paint can be removed from either metal chemically in about the same time at about the same cost.

Protecting the aluminum body from contact with the steel chassis frame and from salt on city streets is more expensive than undercoating steel. Protecting the bottom of the aluminum body from electrolytic action and corrosion calls for the use of anodized metal and anodic sealer. The sealer used, which is a zinc chromate, is hazardous for the painter. It is deadly poison when taken into the body. It is also a very powerful skin irritant. On contact it will burn the skin and cause skin ulcers. Needless to say the equipment necessary to use a sealer or a primer in which zinc chromate is present would be an item of maintenance expense.

Summary

OWNERS of fleets of multi-stop trucks, being necessarily practical, cost-conscious managers, are quite sensitive to factors which compose overall delivery cost: initial investment, maintenance, depreciation, etc., including driver and other labor costs.

Best evidence of their cost-consciousness is the fact that the forward-control chassis with man-high body has become the standard for their multi-stop delivery operations. These trucks provide greater load space (which favorably affects routing, parking, garaging and dock area), handsome appearance, advertising space, easy load-working, convenience for the driver and maximum maneuverability—all of which affects cost of operation.

It has been well demonstrated for this group that the forward-control chassis with man-high body is the kind of truck which serves best (that is, most efficiently and therefore most economically) in multi-stop delivery operations. They have bought tens of thousands of steel bodies for service in scores of multi-stop delivery fields since 1938, and are buying them presently at the rate of 20 to 1 over aluminum bodies.

It is apparent that they have considered in the practical sense what we have been considering in the theoretical sense: the problem of whether the light weight of aluminum bodies offsets cost-wise the lower initial cost, the lower maintenance cost, the more generally adaptable construction and the proved durability of steel bodies for multi-stop deliveries. The consensus is, "No."

END

Please Resume Reading Page 78

ALL NEW B.F.Goodrich WONDER TREAD TRUCK TIRE

cuts costs up to 35%

LOOKS BIGGER – IS BIGGER! NO PREMIUM PRICE!

FLAT AGAINST THE ROAD from shoulder to shoulder! That's the way the new, wide Wonder Tread hugs the pavement. And that's why it runs longer. Piles up amazing mileage records. Cuts tire costs.

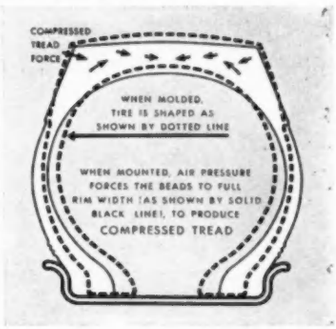
THESE HEAVY DUTY EXPRESS tires are mounted on one of Signal Trucking Service's 2,000 units. This Los Angeles company recaps its B. F. Goodrich tires 2, 3, even 4 times, gets up to 50,000 miles per recap. Compressed Wonder Tread resists cut growth, cracking.

HERE is a completely new highway truck tire that has cut tire costs as much as 35% for leading truck fleets! The long mileage and money-saving features of this tire are brought about by new construction principles which make up its Wonder Tread.

The Wonder Tread of the Heavy Duty Express is molded into a flatter, wider contour. The tread contacts the road from shoulder to shoulder. More rubber is on the pavement. Because a tire wears faster at the center of the tread, the center rib of the Wonder Tread is wider than any of the other four. The flatter tread with widened center rib makes the tire wear slowly, evenly.

TREAD IS COMPRESSED

The Wonder Tread is highly compressed. A compressed tread wears slowly, is more abrasion resistant. Adds mileage. Helps prevent tire growth and tread cracking. The tire is molded with the beads close together. When tire is mounted, air pressure spreads the beads to rim width. The sidewalls act as levers, put the tread under compression.


COMPRESSED TREAD FORCE
WHEN MOLDED, TIRE IS SHAPED AS SHOWN BY DOTTED LINE
WHEN MOUNTED, AIR PRESSURE FORCES THE BEADS TO FULL RIM WIDTH (AS SHOWN BY SOLID BLACK LINE), TO PRODUCE COMPRESSED TREAD

The shoulder design has narrow buttresses which support the outside rib, yet has open spaces for maximum cooling. The tire does not have heavy, heat-holding shoulders.

NYLON SHOCK SHIELD

The Heavy Duty Express tire is made with the patented B. F. Goodrich nylon shock shield (in all tires of 8 or more plies). Layers of strong, elastic nylon cords under the tread stretch together to protect the tire from road shock. Result: more mileage, more recappable tires, more miles per recap, increased bruise resistance, less danger of tread separation.

See the BFG retailer—his address is listed under Tires in the Yellow Pages of the phone book.

Specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Co.
Dept. TF-60, Akron, Ohio

Please send me:
- ☐ name of my nearest retailer
- ☐ free book, "How to get more recaps out of truck tires".

Name_____
Company_____
Address_____
City_____ Zone_____ State_____

Model N 235 Truck and Bus Automatic Cancelling Directional Signal Switch

Arrow's New Automatic Cancelling Directional Signal Switch For Trucks and Buses

RUGGED

CAN'T BURN OUT

FULLY GUARANTEED

- Fits all trucks and buses; easily installed; extra heavy duty brackets.
- Switch cannot cancel out until wheel is turned a full 60° in opposite direction.
- Red pilot indicator and audible click. Switch can be manually cancelled.
- Cannot be burned out; protected by fuse in line.
- Modern styling, with baked enamel finish, attractive plastic handle—8⅝" overall length.
- Available for 6- and 12-volt systems and in the famous Magnalite signal kits.

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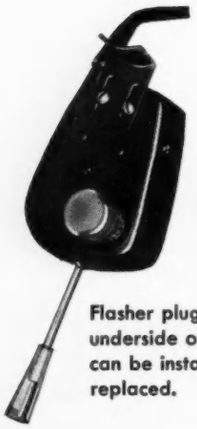

Flasher plugs in underside of switch; can be instantly replaced.

ARROW

SAFETY AFTER DARK

Arrow Safety Device Company
Mt. Holly, New Jersey

Utility Operators

Continued from Page 94

about all the added expense incurred by outside storage in the average location. Said he: "Since vehicles are normally designed to be in the elements five days out of every seven, why should they not stand out for the other two?"

Of course, in northern climates the addition of artificial heating devices, usually of the electric type in public utility fleets is considered desirable. One Chicago operator, using a 1000-watt, 220-volt, electric heater figures it costs 1½¢ per vehicle per hour during the time that these heaters are turned on. Even so this amounted to less than $15 a week compared with his figure of $30 a week for inside storage.

Two or three added "wrinkles" were noted in the meeting. One operator, experiencing difficulty with drivers failing to remember to disconnect the heaters, wired the system so that the ignition was grounded until the heater was disconnected. Another had a pilot light on the outside of the vehicle which not only was a signal to the driver but also indicated to parking lot attendants that the heaters were in operation. Still another indicated the danger of fires from this type of equipment and recommended that they be very carefully installed.

Self-contained gasoline heaters, versus hot water heaters, for a crew compartment and general body heating also came in for discussion. It was generally agreed that the gasoline type heater was best for this purpose, but several companies, even in northern climates, had excellent results with heavy-duty hot water heaters provided engine thermostats were kept at maximum settings and hot water lines to the heaters were of adequate size (usually ¾ of an inch) and insulated with asbestos wrapping.

Probably the most interesting and at the same time most complex discussion of the entire session was a presentation on the economics of motor vehicle replacement through analysis of capital expenditure presented by Joel Dean of Joel Dean Associates, Yonkers, New York. Far too long and too complex for treatment here, it is hoped that CCJ can present the major findings in a future issue.

END

Please Resume Reading Page 96

TIMID AUTO PARTS CLERK: "GINGER ALE."

BARTENDER: "PALE?"

TIMID A.P.C.: "NO—JUST A GLASS FULL."

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. . . **A. W. Hooper,** as Alabama representative, Lewis-Shepard, Watertown, Mass.

. . . **J. C. Scott,** as new product sales manager, Fruehauf Trailer Co., Detroit.

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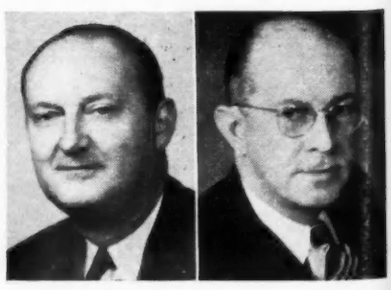
. . . **George Martin,** general service manager, Trailmobile, Inc., Cincinnati, Ohio.

. . . **Jack D. Nigh,** St. Louis district field representative, Associated Tires and Accessories Division, B. F. Goodrich Co., Akron, Ohio.

. . . **Neil J. Curry,** president, California Cartage Co., Los Angeles, Cal.

. . . **Emery J. Szabo,** chief engineer, Leece-Neville Co., Cleveland, Ohio.

. . . **A. A. Shantz,** left, assistant general sales manager—trucks, and **Henry T. DeHart,** right, merchandising manager—trucks, GMC Truck and Coach Division, General Motors Corp., Pontiac, Mich.